GHT, SEPTEMBER 15, 1938 FIRST AERO WEEKLY IN THE WORLD REGD. AT THE G.P.O. AS A NEWSPAPER

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

1551 XXXIV

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

The Crisis

AS we go to press this week everybody is hoping that the crisis in Europe may be settled without the disaster of a European war, in which it is certain that Britain would be obliged to play a part. Nobody wishes to see the various problems of air attack and air defence which have been so often discussed in *Flight* put to the test of fighting. But if the worst should happen we feel convinced that the Royal Air Force will show its superiority in men and machines over all who may be matched against it. A good squadron, as Lord Trenchard once said, can cut its way through inferior material as a knife goes through butter. Likewise we feel sure that no efforts of enemy bombers will ever be able to reduce the British Empire to submission. We propose to examine the whole question of air power in considerable detail in an early issue.

America Gives a Lead

AS the Air Ministry now appears to have lost all interest in the diesel aero engine, but is still the "Contracts Department" for the Admiralty, inasmuch as all aircraft orders for the Fleet Air Arm are put through the Air Ministry and not placed direct, the Naval Air Division at the Admiralty might well take a leaf out of the book of the United States Navy Department and do something towards encouraging diesel development.

Briefly explained, the American policy of the near future is to eliminate the petrol engine from all aircraft operating from cruisers and battleships. It is not held that the diesel can replace the petrol engine in the high-performance aircraft of the rest of the American Navy which operate from carriers.

The explanation of this new policy is that the U.S. Navy desires to eliminate all petrol fuel from cruisers and battleships, the view being held that petrol constitutes a serious fire risk in such circumstances.

What makes the change-over possible is the fact that the American vessels, like our own, catapult their aircraft. Thus, one of the great objections to the diesel, its inability to give a considerable excess of power for a short period during take-off, is overcome, and for purposes of naval scouting the power developed by the present-day diesel, viz., some 500 to 600 h.p., is sufficient.

Exactly the same arguments apply in this country, and *Flight* has more than once pointed out that with the advent of assisted take-off the use of the diesel becomes practicable. The diesel cannot be developed by private enterprise; the cost is too great. But with Government encouragement it is a different matter altogether. We are behind Germany in the matter of diesels, but the position is by no means hopeless if we act at once. And how better than by imitating the example set by America?

Nineteen Years

TEN years makes a period, a decade in fact, which is thought right and proper for the celebration of a notable birthday. Double that, and an age of twenty years seems to excuse some jubilation. Twenty-one years marks a coming of age, and twenty-five years is a quarter of a century, both important occasions. Imperial Airways has just published some comments on the nineteenth birthday of commercial flying, which occurs this year, and nineteen years is an odd number, odd in both senses of the word, which hardly seems to call for an elaborate feast of cakes and ale.

On reflection, however, it may be recalled that the birth of commercial flying is intimately connected with the ending of the Great War, and November 11 next will be the twentieth anniversary of the signing of the

Armistice. That will turn the thoughts of flying people to the peaceful use of aircraft which began in the spring following the Armistice. Reminiscence is inevitable, and each may marvel in his own mind at the remarkable developments which have followed the first commercial flight of a converted D.H.4 across from Hounslow to Paris with passengers—or was it a passenger? But let us not exhaust all our resources of jubilation this year, for next summer we shall have to celebrate the twentieth birthday of commercial flying, and after that the coming of age, and so we shall go on.

John Brown's Baby

WHEN the present panic expansion is over and ordinary commercial considerations rule once more, the future of commercial aviation is likely to be closely linked with the interests of shipping and shipbuilding. In the United States certain shipping interests have recently shown a tendency to challenge the position of Pan-American Airways with plans to enter the field of transoceanic air transport.

In this country the approach has been of a different nature, but for all that it shows a growing realisation of the inherent affinity between air and sea. Several of the British aircraft companies are now controlled by, or have among their large shareholders, shipping, shipbuilding or great engineering firms. The latest development in this direction is the deal by which the famous Clydeside shipbuilding firm of John Brown, builders of the *Queen Mary*, have entered the aircraft industry by securing control of the Westland company of Yeovil.

That the new deal will result in increased output from the Yeovil factories is not to be doubted, although it must of necessity be some time before the Petter works (acquired at the same time) can be converted to aircraft production. All parties are to be congratulated on the deal. John Brown will enter the aircraft industry by way of a firm with a very good reputation, and Westlands will be able to extend their productive capacity without encroaching further on the Yeovil aerodrome. The design staff, under young Teddy Petter, is well qualified to attack modern problems, and the extra factory accommodation should, when in working order, enable manufacture to keep step with requirements.

Ground Strafing Again

IN a recent issue we suggested that the introduction of a special class of aircraft for attacking ground targets ought to be considered, and the same time expressed doubts as to whether fighter squadrons ought to be used for this sort of work. That doubt is strengthened by a report on the recent Army manœuvres on Salisbury Plain, sent in by the special correspondent of the *Daily Telegraph*. Experiments in close co-operation between Army troops and the Air Force have been made there, and the correspondent says that the lesson learnt is that aircraft should be kept to reconnaissance, bombing and fighting other aircraft, except in unusual circumstances. Attacking ground targets is judged to be generally too risky in proportion to the advantages which may be gained.

This conclusion is entirely what we should have expected, and it is satisfactory that the Army authorities have come to recognise the undesirability of using aircraft for purposes outside their proper role. Too often the General Staff of the Army has been accused of ignorance of the limitations as well as of the powers of aircraft—more often of the limitations than of the powers. That charge now seems to have been disproved, which is all to the good.

At the same time, while we quite agree that it is extravagant to divert specialised aircraft from their own duties, that does not mean that other special aircraft ought not to be introduced for the express purpose of attacking ground troops. In 1918 the Sopwith Salamander was a first attempt at introducing this special class, but the war ended before it had been proved out.

In the United States there is a branch of the Army Air Corps devoted to this form of warfare, under the name of the Attack branch. Provided that our Army had sufficient reconnaissance machines to act as eyes, fighters to protect them, and bombers to assail the enemy's dumps and lines of communication, it would surely be glad to have as well special machines for helping to deal with his infantry. Only, let it be laid down as a principle that the ground-strafer's weapon should be, not the machine gun with its plunging fire, but the light bomb—and lots of them.

The Weak Spot

WITHIN a little more than a week of the mishap to the first Albatross long-range monoplane, the sister ship has had its fuselage reinforced and is now flying, having already been taken off and landed at the gross weight at which the passenger-carrying version will be licensed. Thus the statement made by the De Havilland company immediately after the mishap to the machine on August 27, to the effect that the weakness was understood and could easily be remedied, has obviously been substantiated.

The stressing of a monocoque, whether made of metal or wood, is still something of a problem, and so the De Havilland stress department cannot be unduly blamed for having slipped up. In a letter addressed to the Editor, Capt. G. de Havilland states that the breakage of the fuselage was due to a definitely weak point, which allowed a tension failure to occur, and was in no way associated with the type of construction of the fuselage, which is considered entirely satisfactory.

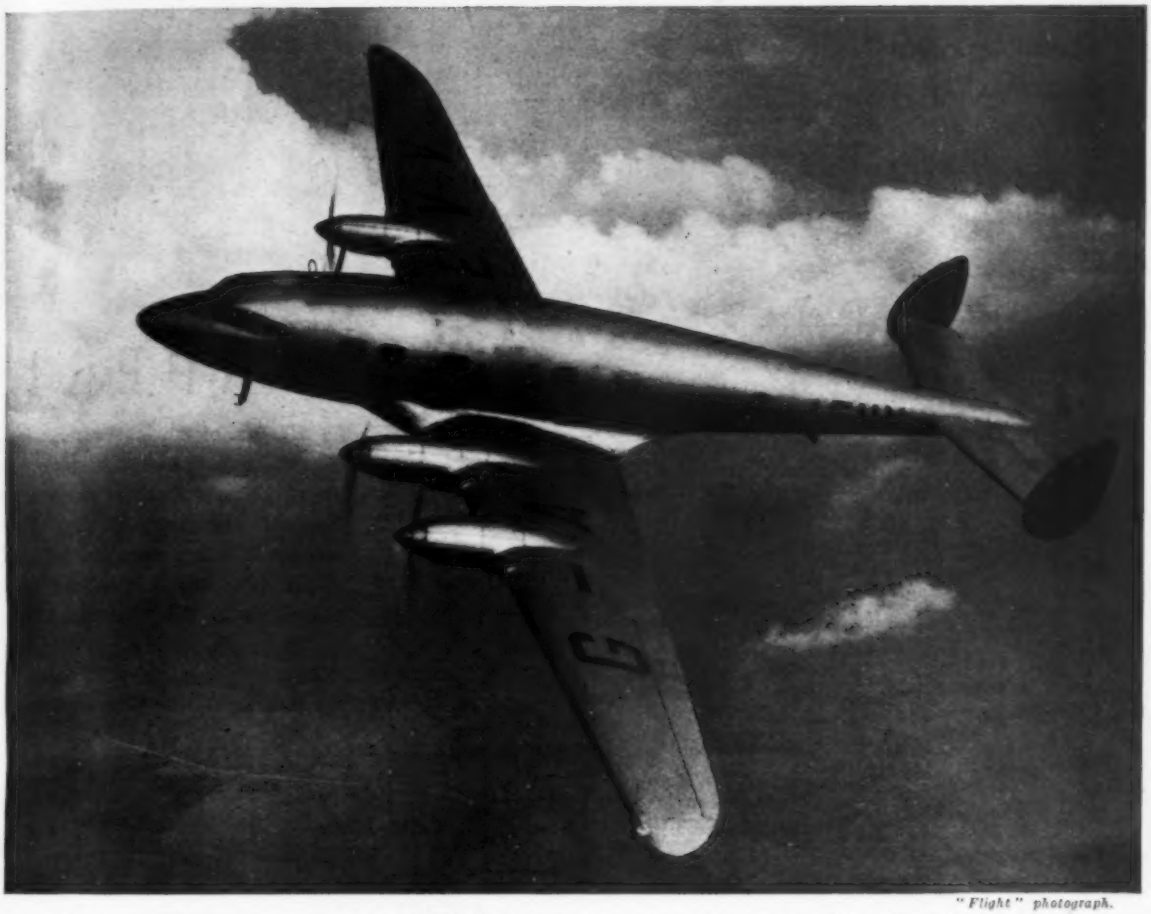
That the weakness was concentrated in one particular locality of the fuselage seems to be proved by the fact that the reinforcement introduced to cure the trouble weighs no more than 12½ lb. Had it been the case that the plywood-cum-balsa wood "sandwich" which forms the shell of the Albatross fuselage was responsible for the failure, it seems pretty obvious that a much greater weight of material would have been needed to bring it up to strength.

Australia

FROM a distance of more than 10,000 miles it is a little difficult to form a clear idea of the many aspects and facets of Australia's air problems. They differ greatly from our own, although they are closely related to them. In some respects they are simpler than ours, in others more complicated. Australia is a land of great distances, and consequently of great possibilities in the air. But the population is comparatively small, and the importance of getting value for money, be it in civil aviation or in questions of air defence, is obvious.

The opening of the new through air route by flying

DIARY OF FORTHCOMING EVENTS—PAGE 241



"*Flight*" photograph.

SUITABLY STRENGTHENED: The second D.H. Albatross long-range monoplane is now flying, having been reinforced at the point in the fuselage which was found to be weak. All the passenger machines will be similarly strengthened. The reinforcement weighs only 12.5 lb.

boat marked the beginning of a new and important chapter in the history of Australia, and *Flight* felt that such an opportunity should not be missed. We therefore sent to Australia by the flying boats of Imperial Airways a member of our Editorial Staff, H. F. King, who has described in his first two articles the outward trip, and who will continue in forthcoming issues with some impressions of the work and requirements of the Royal Australian Air Force.

Situated as she is, Australia can only be attacked from the sea, and her air policy must therefore be based upon the possibility of attack by ship-borne aircraft. Moreover, her Air Force must be mobile in the sense that it must be able to reach any point on her vast coastline from any other point in a minimum of time. That calls fundamentally for long-range military aircraft.

Not only as a link in the Empire chain but also as a large country with independent airlines of her own, Australia holds an interesting position in the world of commercial aviation. In subsequent articles H. F. King will deal with the through-route and inland routes of Australia, and with some of the peculiar problems with which these have to contend. His survey was thorough, and he met during his stay in Australia most of those responsible for carrying out the country's air policy. The results of his enquiries and the conclusions at which he has arrived will be passed on to our readers in the series of articles which we began a week ago.

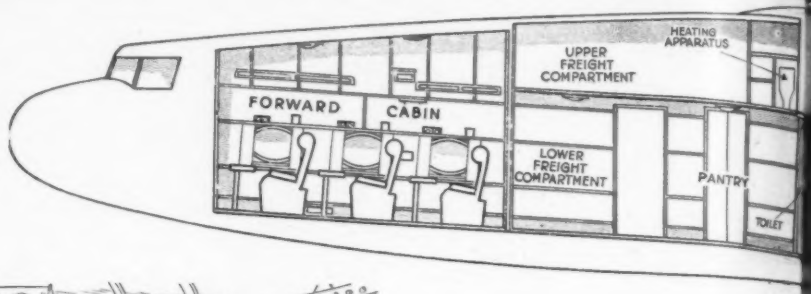
Round the World 50 *Times*

DURING seven years of airline service the Handley Page H.P.42 *Heracles* has flown a distance of one and a quarter million miles. She has carried 95,000 passengers, of whom not a single one sustained injury of any sort, nor did the machine ever have to make a forced landing in all that time. It is the fashion nowadays to sneer at any aircraft which does not cruise at about 200 m.p.h., but few will deny this veteran of the airlines a salute on its seventh birthday.

When Imperial Airways ordered the seven H.P.42s they wanted comfort for their passengers, and that was provided to a degree never before attained in an aeroplane of the heavier-than-air type. They were not prepared to pay for speed, and the modest 100 m.p.h. amble of the 42s satisfied the requirements for several years. And probably the class has come closer to paying for itself than anything which has ever been on the air routes.

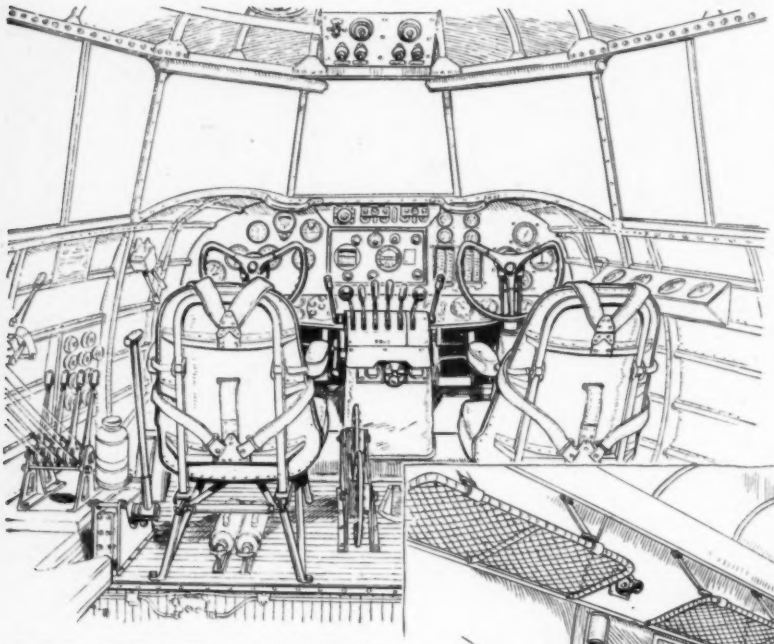
Heracles seems to have proved that, barring accidents, it is obsolescence rather than wear and tear which relegates a commercial aeroplane to the scrap-heap. There are those who think that if and when the present R.A.F. expansion comes to an end constructors will be kept busy supplying the needs of civil aviation. If *Heracles* can be taken as a fair example, and if future aircraft prove as long-lived, the outlook is none too good, from the aircraft constructor's point of view.

Special "Flight" Drawings of the Interior of the A.W. Ensign Airliner

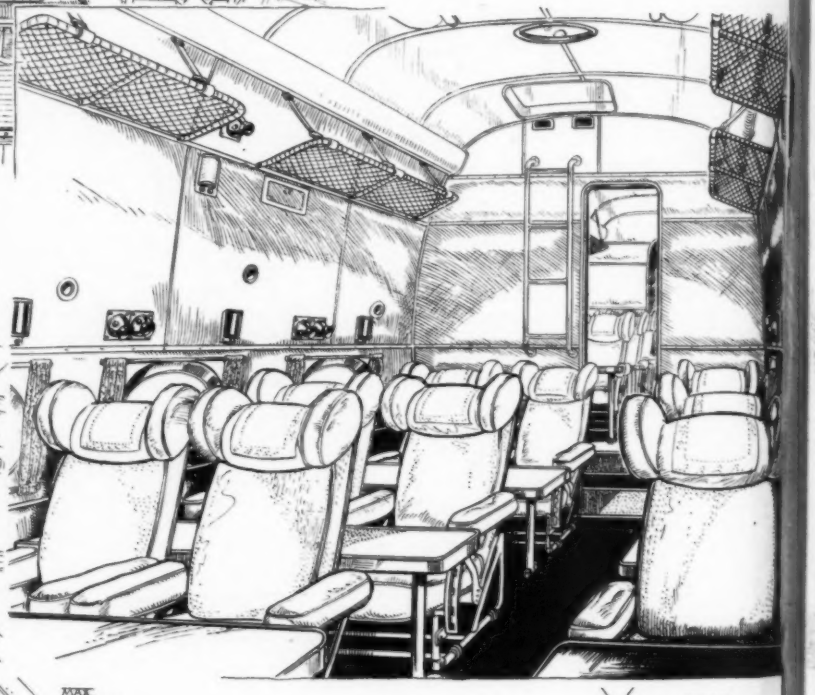


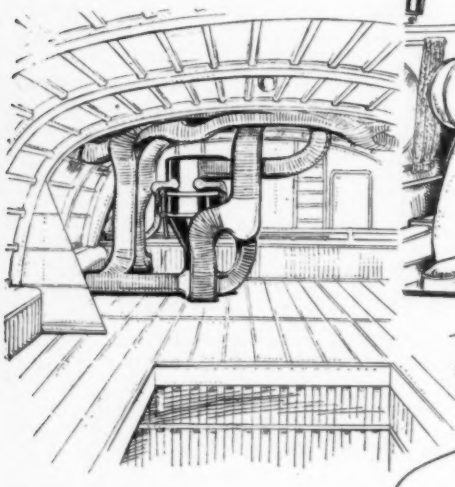
IMPERIAL

THE first of the fourteen Ensign class liners (described in *Flight* of April 1, 1937) are now about to go into service. Powered with four Siddeley Tiger IX engines (880 h.p. each for take-off) the Ensign is of 127 ft. span and carries 40 passengers in the "European" version or 27 by day and 20 by night in the "Empire" type. Below, left, is seen the centre cabin by day, with its adjust-

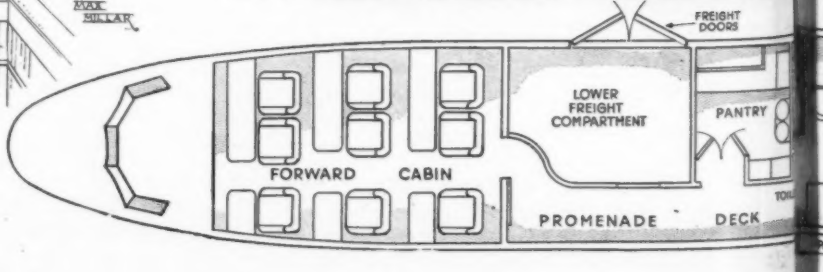


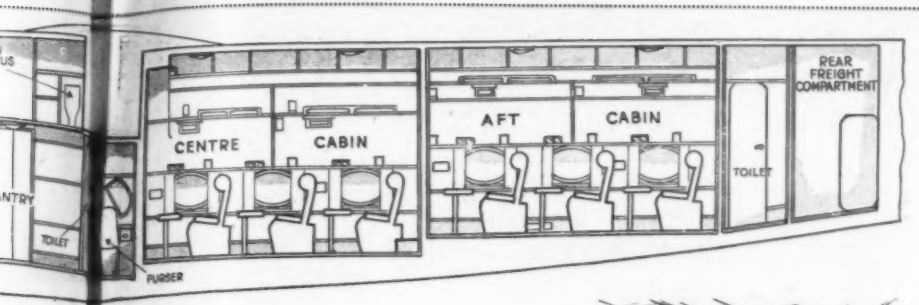
The cockpit: Throttle, mixture and v.p. control bank central, trimming wheels between seats, starter buttons in roof, fuel-cock controls on left.





Cabin warming equipment—by air steam-heated from exhaust muffs on inboard engines.

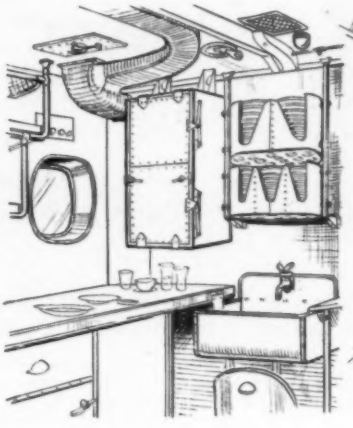


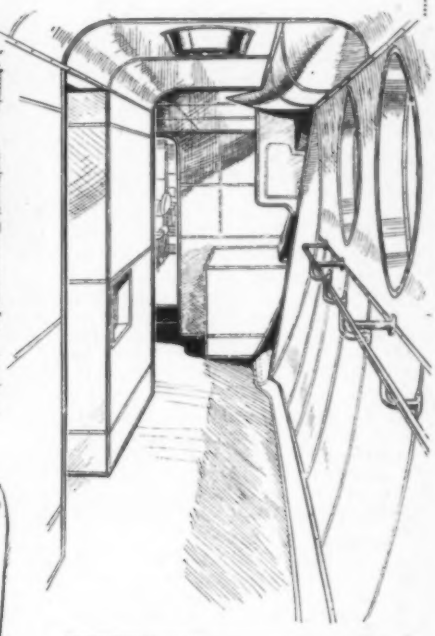


The Passenger Arrangements of the "Empire" Version for Imperial Airways

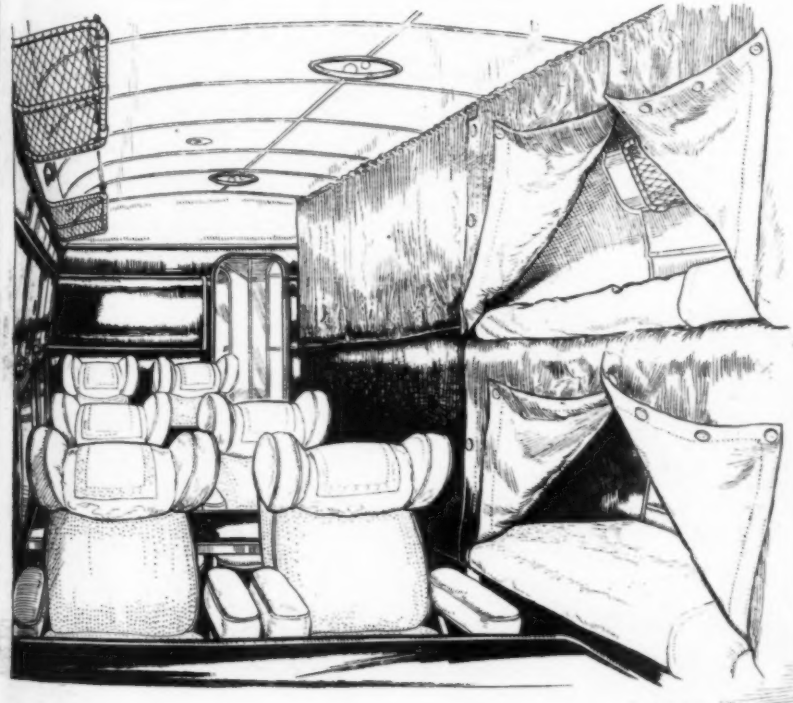
LUXURY

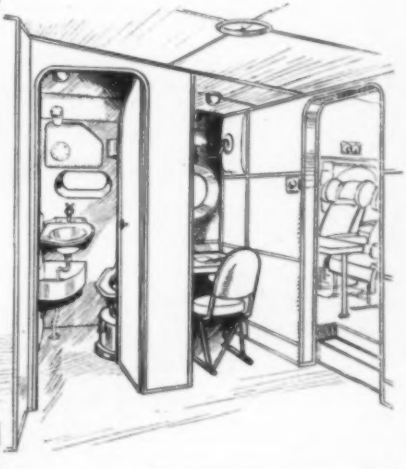
able chairs and tables, individual ventilators and lights, and windows at eye level. The colour scheme is a restful one of green and cream. Below, right, is a cabin partly converted. The seats are removed at the evening halt, and comfortable and roomy bunks substituted. There are four berths in the forward cabin, eight amidships, and eight aft.



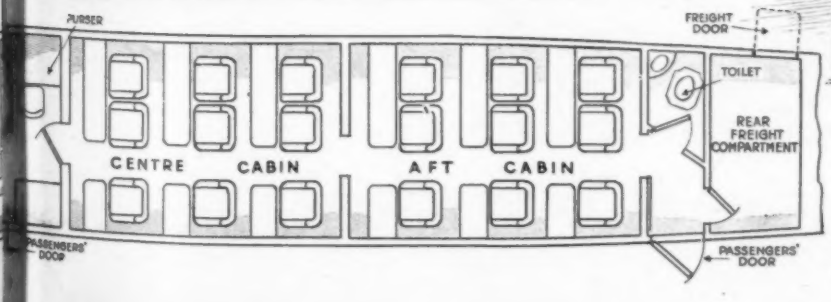


The all-white pantry, with ice-boxes, plate racks, etc. It also contains the cabin heater controls. It opens off the promenade deck, seen on the right.





The toilet compartment and the purser's desk.



THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

ALL Denmark's first-class mail to countries abroad is now being sent by air without surcharge.

Mr. James Rush announces that he has resigned his chairmanship of the London Air Park Flying Club, Ltd., as from August 30.

A world duration record for sailplanes is claimed by two gliding instructors who stayed aloft for 40 hr. 51 min. in a two-seater glider after an aero-tow to 500ft. near Vienna.

Already many of the flying personnel of Imperial Airways flying-boat services have changed to the new nautical-type uniforms. It is the intention of the Company that all officers on Empire and European services shall be similarly clad.

M. Henry Potez, designer and constructor of French military and civil aircraft, was injured last week in a hunting accident near Peronne. M. Potez was taken to hospital, where it was learnt that he had lost the sight of one eye.

Some 6,000 employees at the Austin aircraft shadow factory, who had been on strike since August 29, resumed work last Thursday. Official negotiations with accredited representatives of the employees started on the resumption of work.

Mr. Alex Monteith, who has done much good work in furthering friendly relations between British and German and other foreign private pilots, and who was the moving spirit in the organisation of the York international meetings, is to stand for Parliament. He is to contest the Doncaster Division for the National Government, following the death of Mr. Alfred Short, M.P.

A THIRTEEN-FOOTER: This alarming little biplane has been built (needless to say in America) by Mr. Vincent Linberg in his spare time. On its test flights—made by Mr. James Malone, seen in the cockpit—it did 170 m.p.h., but would appear to be capable of higher speeds.

Twenty-five Years Ago

(From "Flight" of September 13, 1913.)

"Nevertheless, we are far from dissuading the ingenious inventor from persevering with his attempts to devise a really satisfactory folding parachute that can be applied to the body in a moment, and that will open out with absolute certainty when the person jumps into the air."

—AND ANOTHER: The estimated maximum speed of this little Pobjoy-engined monoplane, likewise with a span of thirteen feet, is 235 m.p.h. It has been christened the *San Diego Flagship*, and, like the biplane above, was built for participation in the National Air Races at Cleveland.

Seventeen large aircraft—presumably Consolidated PBY flying boats—led by Lieut. Storrs, completed a mass flight of 2,570 miles non-stop from San Diego to Pearl Harbour, Honolulu, in 16 hr. 48 min. The personnel of the flight totalled 98 men.

In search of data on air currents, the French National Bureau of Research and Invention arranged to "bomb" Paris last Monday with 50,000 postcards. The cards, of various colours, were to be dropped in batches at different heights by aircraft flying up to 18,000ft., finders being asked to post them to the Bureau.

An order for more than 100 air raid warning sirens for the Metropolitan Police area has been placed with Gent and Co., Ltd., of Leicester. Operated by a 4 h.p. electric motor, the sirens are a slightly larger version of those supplied by the same firm as crash and fire alarms for Service aerodromes.

Mr. Michael Romanoff (son of Prince Andrew of Russia and grandchild of the late Tzar's sister, the Grand Duchess Xenia), who, with his sister, Princess Xenia, was granted British naturalisation last week, has been entered as a student at the College of Aeronautical Engineering, Chelsea. He will study for three years with a view to taking up an appointment in the British aircraft industry.

A *Notice to Airmen*, issued last Thursday, states: "Consequent on the absorption of Austria into the German Reich, the Air Navigation Agreement between the United Kingdom and Austria, dated July 16, 1932, is to be regarded as having lapsed. The provisions of the Air Navigation Agreement between the United Kingdom and Germany, dated June 29, 1927, as amended by the agreement dated July 5, 1936, should be regarded as applying to Austria."

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THIS AIR GUARD ARGUMENT

"Those Who Did Not Wait for the Prices to Come Down"

YOUR correspondent "C. A. G. Candidate" seems to have got quite "hot up" over my letter published in *Flight* of August 25 last.

He rather overlooks the fact that numbers of existing pilots, including the writer, will be joining the C. A. G., but they will not be satisfied with a mere 10 hours a year. Neither will "C. A. G. Candidate" when he has learned to fly, and the boot will then be on the other foot!

Another point is that those who have been flying for the past few years will be far more use to the nation than the *ab initio* C.A.G., and it is up to the clubs and the Air Ministry to see that the old members, to whom the clubs owe their existence, are provided with a suitable number of machines with which to carry on as before.

By all means let the C.A.G.s have all the available machines—after some have been reserved for those who did NOT wait for the prices to come down.

"A" PILOT.

London, W.C.1.

ESPERANTO AND AVIATION

English the Easiest Language in the World for a Foreigner?

IN the correspondence column of a recent edition of *Flight* you have a letter written by Mr. F. H. Turner, regarding Esperanto as the international language of aviation. English is the only worth-while international language. It is composed of every language under the sun and with a revision of its alphabet would be the easiest language in the world for a foreigner to learn.

May I call your attention to a book written by an Englishman, Mr. M. Follick: *The Influence of English*, published in London in 1934? If this book were more widely read people would understand why Esperanto is not a suitable international language. The more foreigners able to read and write your language the better for your propaganda and commerce.

In adopting Mr. Follick's thesis for international English, the spelling of everyday English doesn't have to be altered in the slightest.

Why do you English persist in using Latin mottoes for your airplane squadrons when you should use your native language? How many of your countrymen understand Latin?

If you are a free, independent nation use your native tongue for all purposes . . . not early Italian. You may be compelled to use a foreign tongue soon enough if you lose the next war.

A NEW YORKER.

N.Y.

AIRCRAFT NOISE AND THE PUBLIC

Aerobatics the Chief Cause of Annoyance?

LETTERS of varying degrees of ferocity about aircraft noise are now appearing almost daily in the newspapers, and it is obvious that the intensive Reserve School operations provide the major part of the material for these grumbles.

Though it may fairly be argued that at a time like the present it is up to the public to bear patiently with the matter, one must concede that to the average non-mechanically minded person, seeking quietness in his town or country retreat, aircraft noise *is* a very real irritant.

One way in which Reserve Schools and other such training centres could minimise the nuisance occurs to me, and perhaps those concerned may care to say whether my suggestion is practicable.

In this particular neighbourhood we are within easy reach of a number of aerodromes, several of which have Reserve Schools, while others are used by aircraft constructors for testing purposes. Particularly on fine evenings, and at weekends, there is almost ceaseless activity, while British Airways' Lockheeds, proceeding ex-Heston in fine pitch, add handsomely to the orchestra (though we do set our watches by them, and the 8.35 a.m. Electra is a useful emergency alarm clock).

But the larger part of this din is made by aerobatic enthusiasts in Tiger Moths and Hart Trainers, and their glorious *crescendos* and sudden brief silences seem to cause much more irritation to my elders than does the steady drone of somebody proceeding sedately from A to B.

Moreover, each of these artists seems to prefer the same cubic mile of sky, and confines all his evolutions to that area for, perhaps, half an hour.

Now would it not be possible for schools to issue instructions that aerobatics must not be practised for more than, say, five minutes in one particular spot? After that time the pilot would have to proceed at least five miles in a straight line before continuing his evolutions.

It might be argued that this would merely mean listening to six Hart Trainers for five minutes each instead of one for half an hour. In practice, I imagine, it would mean quite long periods of comparative silence.

In any case, it seems obvious that the question of air congestion and safety in such areas as this will soon have to be tackled seriously with new regulations. I seem to remember that *Flight* recently commented on this necessity.

Kingston-on-Thames. GROUNDLING.

PERSONAL INSURANCE

Reductions in Extra Premiums for Endowment Assurance

SINCE the publication of my letter on personal insurance premiums in last week's issue (p. 206), it has occurred to me that, in endeavouring to be concise, I may not have made it clear that the possible variation of the extra premiums mentioned does not necessarily mean that they will be increased. Actually, where an endowment assurance is effected for a period of less than 30 years, a reduction in the normal extra premium for flying risks would be allowed.

Without giving a full table of these rates the following are illustrations of the position:—

The annual extra of 10s. per cent. for a member of the Civil Air Guard would be reduced from an annual extra of 10s. per cent. to 9s. per cent. for a 20-year endowment; 8s. per cent. for a 15-year endowment; or 7s. per cent. for a 10-year endowment.

Subject again to no special circumstances, the reductions in extra premiums in respect of other categories mentioned would be on a *pro rata basis*.

S. F. LYDON.

London, E.C.4.

A Policy-holder's Dilemma

I HAVE read with great interest Mr. S. F. Lydon's remarks in your September 8 issue.

I have laboured under the impression that my policies included flying risks during peace time. When I completed my proposal I gathered that, provided it was not my intention to engage in aviation at the time of completing the form, if on some future occasion it became necessary to undertake flying risks, then such risks would be covered.

From Mr. Lydon's remarks one would gather that it might prove difficult to secure such cover, even after payment of an additional premium. If such is the case it seems that policy-holders must lose money by adopting the suggestion of your correspondent, *i.e.*, "cease paying premiums to them and arrange for sum assured to be reduced according to the number of premiums paid. The saving can then be utilised by taking out a new policy with another company."

Does not this mean that the amount available for the new policy will be sufficient only for a much-reduced sum assured, as provision must be made for increased age?

I would appreciate information on this point.

London, S.W.2. W. H. JAYCOCK.

AIR MAIL IN 1919

Information Wanted from Ex-pilots of No. 110 Squadron

MAY I thank you for so kindly inserting my letter in *Flight* with reference to Nos. 18 and 120 Squadrons and their work of carrying the mail to the Army of Occupation on the Rhine from March to August, 1919?

This letter received a very encouraging number of replies, and one correspondent reminds me that No. 110 Squadron also participated in this work for the opening weeks. May I once again crave the use of your columns to ask if there are any pilots or personnel of No. 110 who would be able to assist me in collecting together material for this book on the first regular air mail service out of England?

At the time, No. 110 Squadron was stationed at Maisoncelle (Marquise, France).

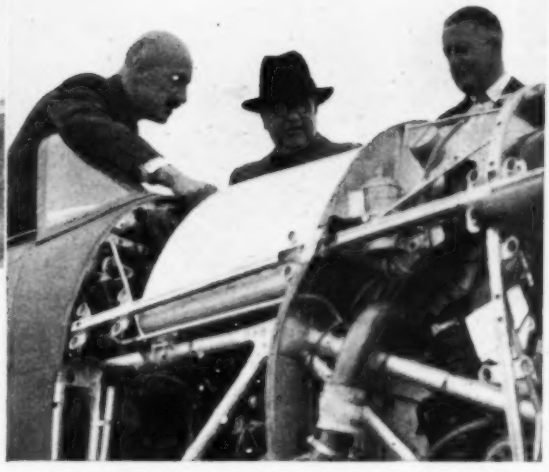
L. PEARCE-GERVIS.

Green Shutters,
Hellingly,
Hailsham, Sussex.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News : Official Announcements : Military Aviation Abroad

"*Flight*" photographs.



THE AIR MINISTER, continuing his tour of aircraft factories and aerodromes, last week visited Hawkers and Vickers at Brooklands. He is seen above examining a Hawker Hurricane with (on left) Flt. Lt. P. W. S. Bulman (director and chief test pilot) and Mr. F. S. Spriggs (managing director). In the other picture the Air Minister is seen under the imposing nose of a Wellington, with a Wellesley in the background. On the left is Sir Robert McLean, chairman of Vickers Aviation Ltd.

Changes in the Higher Appointments

THE Air Ministry announces the appointment of Air Comdre. William Ashton McClaughry, D.S.O., M.C., D.F.C., to be Director of Training, Air Ministry, with effect from a date in October, *vice* Air Comdre. Robert Leckie, D.S.O., D.S.C., D.F.C., who assumes command of Royal Air Force, Mediterranean, in that month.

Air Comdre. McClaughry, born in 1894 in Australia, was appointed to a commission, as 2nd Lieutenant, in the Australian Imperial Forces in 1913 and, in June, 1916, was seconded to the R.F.C. as a Flying Officer. During the War he served in France, and besides gaining the D.S.O., M.C., and D.F.C., was mentioned in despatches on three occasions.

In 1919 he was appointed to a permanent commission as Squadron Leader in the R.A.F., and resigned his appointment in the Australian Imperial Forces.

Air Comdre. McClaughry has completed courses at the R.A.F. Staff College and the Imperial Defence College, and his appointments have included the command of No. 8 (Bomber) Squadron, both in Iraq and Aden, several appointments on Air Staff Duties, and the command of R.A.F. Station, Heliopolis. Since July, 1936, he has been commanding the British Forces in Aden. He was promoted to Wing Commander in 1929, to Group Captain in 1934, and to his present rank in January, 1938.

Air Comdre. Leckie, born in 1890, was commissioned in the R.N.A.S. in 1915, and during the Great War served conspicuously in coastal defence units, gaining the D.S.O., D.S.C., and D.F.C. for his services in action against invading enemy airships and submarines. In March, 1919, he was seconded to the Canadian Air Force, and, in August that year, was granted a permanent commission in the R.A.F. as a Squadron Leader. For three years, from the end of 1919, he held the appointment of Director of Flying Operations at the Canadian Air Board. On his return to the R.A.F. in 1922 he was posted to the School of Technical Training (Boys), Halton, and later attended a course at the Royal Naval Staff College. In 1923, Air Comdre. Leckie was employed on Technical Staff Duties, and as Senior Air Force Officer in H.M.S. *Hermes* in 1926. In 1929 he commanded the R.A.F. Station at Bircham Newton and No. 210 (F.B.) Squadron in 1931. On appointment as Superintendent of the R.A.F. Reserve in 1933 he was given the command of the Station at Hendon. Since October, 1936, he has been Director of Training, Air Ministry.

He was promoted to Wing Commander in 1926, to Group Captain in 1933 and to his present rank in January, 1937.

Canadian Production

IN view of the activities of the British mission in Canada, already recorded in *Flight*, a brief survey of current production of British-designed aircraft in Canada may be of interest.

The De Havilland Aircraft of Canada, Ltd., has recently delivered to the Royal Canadian Air Force 26 Tiger Moth trainers with Gipsy Major engines.

Canadian Vickers, Ltd., is building 10 Supermarine Stranraer flying boats for Canadian military use. These are having Pegasus engines and will be similar to the standard R.A.F. type. The same Company, incidentally, is engaged on a contract for 13 Northrops for photography and survey.

Boeing Aircraft of Canada, Ltd., is building 17 Blackburn Shark II floatplanes.

The Fairchild Aircraft, Ltd., are working on a Canadian Government contract for 18 specially developed Bristol Blenheims for bombing and reconnaisance.

Twenty-eight Westland Lysanders are going into production at the new Toronto factory of the National Steel Car Corporation.

The Ottawa Car Manufacturing Company is assembling a batch of Avro 626 multi-purpose trainers and is also engaged on a contract for the reconditioning of Canadian Service aircraft.

Aircraft Carrier from Australia

SENT in part payment for two cruisers, the Australian aircraft carrier *Albatross* arrived at Plymouth last Thursday from Sydney to be handed over to the British Navy.

Completed in Sydney in 1928, at a cost of £1,250,000, the *Albatross* (4,800 tons) has accommodation for nine seaplanes or flying boats (formerly of the Seagull type—similar to the Walrus), catapult equipment and a crane.

Engines for Hampden and Wellington

THE official name of the new Bristol nine-cylinder air-cooled radial engine with two-speed supercharger to be introduced into the Service in the Handley Page Hampden and Wellington twin-engined bombers is Pegasus XVIII.

This unit has the advantages of both medium and full supercharged engines, the change in supercharger speed being effected by a gear comprising three hydraulic clutch units actuated by oil from the main pressure lubrication system. The gear ratio is 0.5: 1 and the weight 1,110lb. Figures under medium supercharged conditions are: Take off power, 980 h.p. at 2,475 r.p.m.; international rated power, 820/855 h.p. at 5,000ft.; and maximum power for all-out level flight (five minutes), 940 h.p. at 6,500ft. and 2,600 r.p.m. Using full supercharge the international rated power is 765/800 h.p. at 15,500ft., and the maximum power for all-out level flight 900 h.p. at 17,750ft. and 2,600 r.p.m. The engine is rated on fuel of 87 octane number.

On the Wellington a crankcase cowl with louvres as popularised in America will be standardised, but this device does not feature in the first of the production-type Hampdens.

The sleeve-valve Hercules and water-cooled Merlin are alternatives in the Wellington.

SQUADRON LEADER M. J. ADAM, A.F.C.

WITH great regret, *Flight* records the death of Sqn. Ldr. Maurice James Adam, A.F.C., which occurred on Monday last as the result of a crash at Farnborough. Flt. Lt. R. Monks was the pilot of the machine and tne wireless operator was Mr. B. T. E. Bond, a civilian employee of the Royal Aircraft Establishment. The machine, a Whitley bomber, burst into flames after striking, and all three were killed.

While all three deaths are equally tragic, and while the death of any of the Farnborough test pilots is a grievous loss to the R.A.F., public attention is naturally concentrated on the fate of the holder of the world's altitude record. It will be remembered that in September, 1936, Sqn. Ldr. F. R. D. Swain, flying the Bristol 138 monoplane, reached a height of 49,944ft. and established a world's record. This was then surpassed by the Italian, Lt. Col. Mario Pezzi, with a height of 51,362ft. Modifications were made to the Bristol monoplane and engine, and Flt. Lt. Adam (as he then was) was chosen to make the next attempt. On June 30 last year he flew it to a height of 53,937ft., and regained the record for Britain. For this he was awarded the Air Force Cross.

Sqn. Ldr. Adam was born at St. Andrews in 1908 and was educated in his native town and at George Heriot's School, Edinburgh. In 1929 he was granted a short-service commission in the R.A.F., and afterwards a medium-service commission. He qualified at No. 1 F.T.S., Netheravon, and served with No. 24 (Communications) Squadron and then with No. 11 and No. 60 (B) Squadrons in India. He saw active service on the North-West Frontier and returned to England towards the end of 1935, when he was posted to the Experimental Section of the R.A.E. at Farnborough. A fortnight after his record flight he married Mrs. Doreen Marjorie Martin, with whom deep sympathy will be felt.

R.A.F. Boxing Association

THE annual general meeting of the R.A.F. Boxing Association will be held in Room 271, Air Ministry, Adastral House, Kingsway, W.C.2, on Wednesday, September 21, at 14.30 hours.

Recruiting Returns

RESULTS for the eleventh week of the new R.A.F. recruiting campaign for 31,000 pilots, observers, airmen and boys, are announced by the Air Ministry. The total number of men enlisted during the week was 711, making a total of 5,980 since the campaign began eleven weeks ago.

The applications during the week for entry in the various classes were 1,412; as airmen 1,286, as pilots 110, and as observers 16.

Queen Bee Depot Ship

H.M.S. *Argus* (Capt. W. G. Benn), now fitting out at Portsmouth, is the first aircraft carrier to be commissioned on the new Fleet Air Arm basis. She has no Royal Air Force headquarters and very few R.A.F. officers, though she does carry the usual complement of R.A.F. fitters and riggers, because the Navy has no skilled ratings available.

The *Argus* in her new form is a depot ship for Queen Bee wireless-controlled target aircraft. She will serve as required with the Home Fleet and Mediterranean Fleet and will join the Home Fleet during its autumn cruise.

Although the Queen Bee unit is normally Royal Air Force it is under the operational control of Lt. Cdr. R. A. Peyton.

A Fleet Requirements Flight is also carried. This is a Fleet Air Arm unit and is in the charge of Lt. Cdr. H Wright, R.N.

Queen Bees will be launched by an accelerator.

Central Flying School Categories

THE undermentioned reserve officers have recently been tested at the Central Flying School, and are awarded the following categories:

A.2.—Flt. Lts. J. C. Evans, I. G. E. Dale, R. C. W. Ellison.

B.—Flt. Lt. A. Moncrieff, F/O. F. B. H. Hayward, P/O. C. F. French.

The Air Force List

THE September issue of the *Air Force List* has now been published. It can be purchased (price 4s.) from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.

R.N.A.S. Mediterranean Reunion

THE reunion dinner of the R.N.A.S. East Mediterranean No. 2 Wing, H.M.S. *Ark Royal* and *Canning* (1915-18), will be held on October 19. Details can be obtained on sending a stamped-addressed envelope to Major E. S. Savory, 35, Hanover Gate Mansions, London, N.W.1, or to Mr. A. G. Furlong, 29, Kenton Park Avenue, Kenton, Harrow Middlesex.

Flying Accidents

THE Air Ministry regrets to announce the following accident:—Sgt. Stanley Robert Morris lost his life in an accident which occurred at Edmonton, London, on September 4 to an aircraft of No. 1 Elementary and Reserve Flying Training School, Hatfield. Sgt. S. R. Morris was the sole occupant of the aircraft.

Royal Air Force Gazette

General Duties Branch

The following are promoted (September 1):—

Squadron Leaders to be Wing Commanders.—A. P. Colthurst (Cdr., R.N.); J. I. Robertson (Cdr., R.N.); J. B. Heath (Cdr., R.N.); C. W. Byas (Cdr., R.N.); G. C. Dickins (Cdr., R.N.); G. Willoughby (Cdr., R.N.); C. John (Cdr., R.N.); D. W. Mackendrick (Cdr., R.N.); H. A. Traill (Cdr., R.N.).

Flight Lieutenants to be Squadron Leaders.—R. A. Peyton (Lt. Cdr., R.N.), (seniority, January 1, 1936); G. K. Martyn (Capt., R.N.), (seniority January 1); S. W. D. Colls (Lt. Cdr., R.N.); J. A. D. Wroughton (Lt. Cdr., R.N.); W. G. C. Stokes (Lt. Cdr., R.N.); W. H. G. Saunt (Lt. Cdr., R.N.); J. D. C. Little (Lt. Cdr., R.N.).

Flying Officers to be Squadron Leaders.—H. C. Ranald (Lt. Cdr., R.N.), (seniority, July 1, 1937); C. A. Kingsley-Rowe (Lt. Cdr., R.N.), (seniority, January 1); H. L. Hayes (Lt. Cdr., R.N.), (seniority, January 1); H. Wright (Lt. Cdr., R.N.), (seniority, January 1).

Flying Officers to be Flight Lieutenants.—J. O. Mansell (Lt. Cdr., R.N.), (seniority, July 1, 1938); J. N. Garnett (Lt., R.N.), (seniority, January 1, 1938); P. M. Gregory (Lt., R.N.); H. E. R. Torin (Lt., R.N.); M. W. Watson (Lt., R.N.); H. S. MacN. Davenport (Lt., R.N.); E. A. Greenwood (Lt., R.N.); E. D. G. Lewin (Lt., R.N.); R. L. Johnston (Lt., R.N.); R. C. B. Stallard-Penoyre (Lt., R.N.); H. D. Mathew (Lt., R.N.); P. N. Medd (Lt., R.N.); N. E. Ward (Lt., R.N.); A. G. Leatham (Lt., R.N.); F. D. G. Bird (Lt., R.M.); N. T. O'Neil (Lt., R.N.); P. W. Compton (Lt., R.N.); A. S. Whitworth (Lt., R.N.); R. A. W. Dobbs (Lt., R.N.); P. E O'Brien (Lt., R.N.); R. J. W. Nott (Lt., R.M.).

Capt. G. K. Martyn, R.M., is re-attached to the Royal Air Force as a Flight Lieutenant with effect from August 22, and with seniority of July 1, 1931 (notifications in *Gazettes* of March 10 and 17, 1936, concerning this officer are cancelled); Lt. D. R. F. Campbell, R.N., is re-attached to the Royal Air Force as a Flight Lieutenant with effect from August 29 and with seniority of January 1, 1935; Lt. Cdr. A. C. R. Duvall, R.N., Flight Lieutenant, R.A., ceases to be attached to the Royal Air Force on return to Naval duty (August 29); Sqn. Ldr. C. A. B. B. Wilcock, A.F.C., is placed on the retired list at his own request (September 5).

The following Flight Lieutenants are transferred to the Reserve, Class A, on the dates stated:—H. V. Kennedy, J. R. L. Rumsey, E. L. A. Walter (September 2), G. N. Snarey, A.F.C. (September 15.)

Flt. Lt. D. W. H. Gardner is transferred to the Reserve, Class C (September 2).

Accountant Branch

F/O. E. Bowman (Acting Flt. Lt.) is promoted to the rank of Flight Lieutenant (June 1).

Medical Branch

Air Comdre. B. A. Playne, D.S.O., M.B., B.Ch., M.R.C.S., L.R.C.P., is placed on the retired list at his own request (September 1).

The following Flight Lieutenants are transferred to the Reserve, Class D (September 2):—C. M. Carlyle-Gall, M.R.C.S., L.R.C.P., D.P.M.; W. J. L. Dean, M.B., Ch.B.; T. J. M. Gregg, M.B., B.Ch.

Dental Branch

F/O. H. B. Shay, L.D.S., is promoted to the rank of Flight Lieutenant with effect from August 8, and with seniority of April 1.

SERVICE AVIATION (CONTINUED)

Royal Air Force Reserve

Reserve of Air Force Officers
General Duties Branch

Flt. Lt. E. G. H. Russell-Stracey, A.F.C., is transferred from Class A to Class C (November 13, 1937).

The following are transferred from Class C to Class B (September 6):—(Equipment Branch): Flt. Lts. J. H. Bentham, A. R. Eceree, W. H. Stiles, H. W. Allen, F. G. Saunders, M.C.

Flt. Lt. J. E. Clarke relinquishes his Reserve commission on completion of service (July 29). The following relinquishes his commission on completion of service on the date stated:—Flt. Lt. G. Veevers-Carter (August 6).

Royal Air Force Volunteer Reserve

General Duties Branch

Lt. Col. P. Y. Birch, D.S.O. (R.A.R.O.) is appointed Hon. Wing Commander (July 11).

Auxiliary Air Force

General Duties Branch

No. 905 (COUNTY OF SURREY) (BALLOON) SQUADRON.—J. C. W. MacBryan is granted a commission as Flight Lieutenant (July 5).

Royal Air Force Appointments

General Duties Branch

Air Commodore.—A. T. Harris, O.B.E., A.F.C., to H.Q., R.A.F., Palestine and Transjordan, Jerusalem; to Command, 13.7.38.

Squadron Leaders.—H. R. McL. Reid, D.F.C., to Special Duty List; on appointment as Assistant Air Attaché, Santiago, 12.7.38. C. H. Stilwell, to No. 2 Armoured Car Company, Ramleh, Palestine; to Command, 27.7.38. W. R. Sadler, to H.Q., R.A.F., Middle East, Cairo, Egypt; for Air Staff duties, 3.8.38. W. V. L. Spendlove, to No. 11 (B.) Squadron, Risalpur, India; to Command, 30.7.38.

Flight Lieutenants.—L. J. Crosbie, to H.Q., R.A.F., India, Simla, 5.8.38. F. C. Daubney, to H.Q., No. 1 (Indian) Group, Peshawar, 5.8.38. F. C. Scott, to No. 210 (G.R.) Squadron, Pembroke Dock, 29.8.38. V. J. Sofiano, M.B.E., to Deputy Directorate of Intelligence, Air Ministry, 26.8.38. N. A. R. Halliday, to Aircraft Depot, Karachi, India, 15.8.38. A. McD. Bowman, to No. 2 (Indian Wing) Station, Risalpur, India, 11.8.38.

Medical Branch

Squadron Leader.—C. Crowley, to No. 4 School of Technical Training (Men), St. Athan; for duty as Medical Officer, 1.9.38.

Flight Lieutenant.—P. A. Lee, to R.A.F. Station, Aldergrove, 28.8.38.

Owing to the greatly increased length of these lists, as a result of R.A.F. expansion, ranks are confined to those of Flight Lieutenant and above.

FOREIGN SERVICE NEWS

Italian Anti-Aircraft Defence

INSTITUTIONS which would call for anti-aircraft defence in time of war (e.g., ports, municipalities and commercial establishments) are to be invited by the Italian Government to supply their own anti-aircraft guns and ammunition. These will be their own property but in time of war will come under military control, the guns being served by special militia units.

General Foschini, who instituted the scheme has pointed out that in time of war protection of such interests would be beyond the power of the Government.

French Reorganisation

A DECREE reorganising the French Air Force has been submitted to the French President by M. Le Chambre, the Air Minister.

According to the *Daily Telegraph*, technical commissions enquiring into recent accidents "have been insistent that the mettle and dash of the personnel could not be called into question for a moment." The accidents were due in a very large degree to lack of organisation of command.

After consultation with the Superior Air Council the Air Minister has decided that unified control between the fighting command and the Technical Supply Services should be instituted.

The Armée de l'Air will henceforth be divided into areas on the lines of the army areas. In each, it is reported, the whole of the personnel will be under the command of a general.

Transport-Trainer

THE first of thirteen modified Lockheed 12 twin-engined monoplanes with Pratt and Whitney Wasp Junior engines is now being tested preparatory to delivery to Dayton, Ohio. These machines will be used for high-speed communications work and transport and for training pilots in the operation of multi-engined equipment.

The order, which is the first major contract ever received by the Lockheed Company from the United States Government, will be completed by December.

JOHN HINDMARSH

IT is with deep regret that *Flight* records the death on September 6 of Mr. John Hindmarsh, a well-known test pilot at the Hawker establishment at Brooklands. For some reason which did not emerge at the subsequent inquest (though the possibility of the pilot having been taken ill was debated) the Hurricane which Hindmarsh was testing was in a steep dive when it struck the ground at St. George's Hill, Weybridge. The contents of the fuel tanks exploded, but the pilot had obviously and mercifully been killed instantly by the impact.

Thirty years of age at the time of his death, Hindmarsh was educated at Sherborne. He had been with the Hawker Company since February, 1935. On leaving school he went to Sandhurst, and subsequently received a commission in the Tank Corps. From there he was seconded to the R.A.F., and learned to fly at No. 2 F.T.S., Digby. He was with army co-operation units at Old Sarum, and then with No. 4 (A.C.) Squadron at Farnborough. Being so keen on flying, he resigned his commission in the Army rather than return to the Tank Corps when required to do so. He then secured his post as a test pilot with Hawkers.

He was as popular among the motor-racing fraternity as he was in aviation, having been a consistent competitor in important car races over a number of years. In June, 1935, with Louis Fontes, he won the 24-hours' endurance race at Le Mans, and in the following year he was a member of the team taken out to Salt Lake City by John Cobb to attack twenty of the world's principal speed records.

A characteristic portrait of the late John Hindmarsh.

Hindmarsh, who lived at Cobham, Surrey, was married in September, 1931, to Miss Violette Cordery, the racing motorist.

The chief photographer of *Flight*, who had flown with Hindmarsh on a number of occasions, writes the following appreciation:—

"Johnny Hindmarsh was a particularly good scout and I have enjoyed many flights with him. His uncanny judgment of speed and distance made him an ideal photographic pilot from my point of view for, whether he flew the photographing or photographed machine, one could guarantee that he would be at the right spot at the right moment.

"He had one very English trait of character—that of keeping up a running fire of humorous disapproval of the business in hand, though at the same time he was really flat out with enthusiasm and helpfulness. One had always to be careful how much one demanded of Johnny, for he never refused.

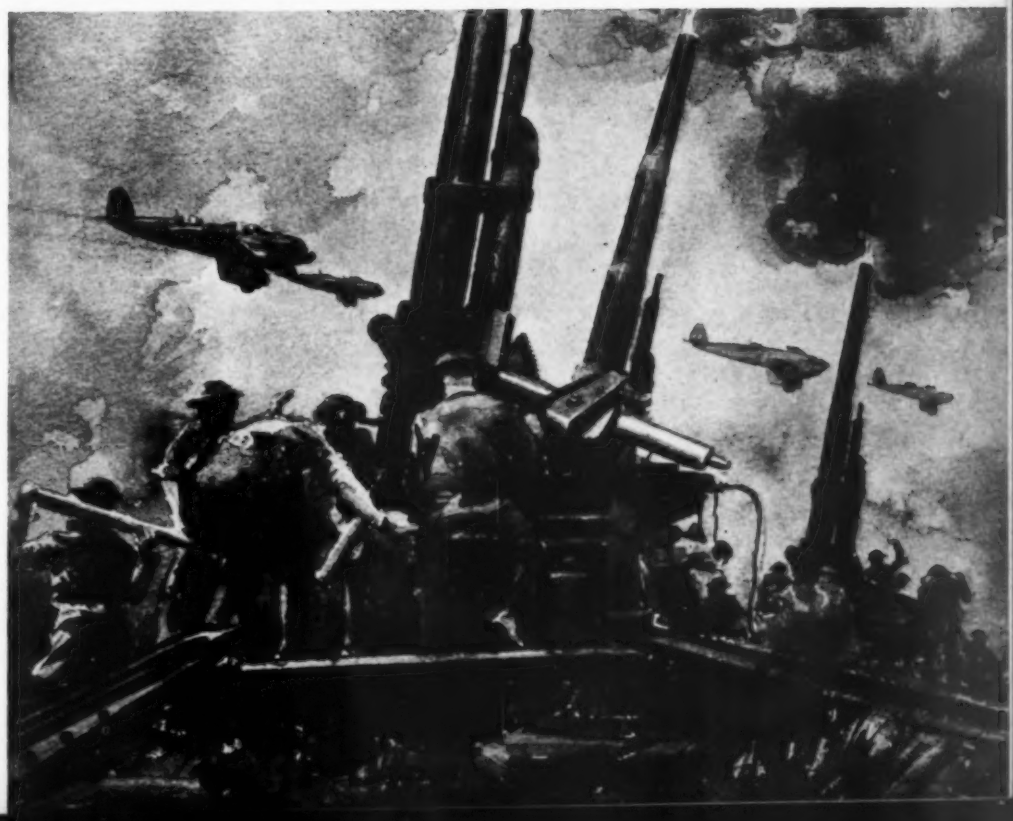
"Only a fortnight ago we flew together to photograph Philip Lucas doing "hands-off" aerobatics in a Hurricane, and one could not help sensing the wonderful confidence each pilot had in the other. Hawkers have lost a very excellent pilot and I, in common with a large number of people in the aircraft industry and motor-racing circles, have lost a very good friend."

To his widow and her two young daughters *Flight* extends its sincerest sympathy.

FROM the STATES

(Above) An unusual and striking formation put up by Seversky single-seater fighters of the 27th Pursuit Squadron, U.S. Army Air Corps, for a display at the National Air Races, Cleveland. The Seversky, with a Pratt and Whitney Twin Wasp of over 1,000 h.p., has a top speed of about 300 m.p.h. The gun-power is believed to be inferior to that of our own monoplane fighters.

(Right) This painting of A.A. crews in action is typical of the virile work of an American artist, Alfred Owles, who recently held an exhibition of his aviation pictures in Los Angeles. He formerly lived in England, and served as a pilot in the U.S. Photographic Corps during the war. The aircraft in the painting are Curtiss Shrikes.



EMPIRE RETURN

PART II—The Karachi-Sydney Stretch of the Australian Route, and some Cameos of the Return Trip

By H. F. KING

SUNDAY, JULY 24.—The Imperial signpost at Karachi tells us that we are 4,915 miles from London—not yet half way to Sydney with some of the most intriguing sections of the route before us.

The oil-stained Sunderland at moorings near *Camilla* has a mere 3,400 miles to go to Singapore.

There are clouds over India and we see little of the southern Sind Desert or of the canal system fed by the Lloyd Barrage as we approach Raj Samand, our next stop. About four hundred years old, this great reservoir is sacred, and First Officer Spottiswoode requests that we shall throw nothing in the water, though it is inhabited by the most repulsive crocodiles. As we round the reservoir in the control launch we admire the temple, palace and dam for which Raj Samand is famed.

Our port outer engine has been a little unhappy, cutting out when approaching the buoy. Mr. Luck, the G.E., has a busman's holiday.

Gwalior, about 270 miles "up the line," has the lake of Madho Saga as an alighting base and boasts a superb fort. Both at Gwalior and Raj Samand the water level, and consequently the landing areas, alter very considerably. Before landing the pilots send a radio message to ascertain what area is available.

On the Gwalior-Allahabad stretch we are up against formidable head winds and come very low, making an intimate study of the fields and farms, the trees crowding into the level spaces, the muddy lakes and the herds of white oxen.

It is getting bumpier. I am hot and feel sick. Somebody, after a valiant struggle against internal revolt, leaves his seat firmly but swiftly as we approach the Jumna. On return he displays not the slightest interest in the Jumna nor (in common with everyone else) the chocolate éclairs proffered by the steward at the end of a generally unappreciated, though nevertheless excellent, lunch.

There is little enthusiasm for the sacred confluence of the Ganges and Jumna at Allahabad, nor for the prospect of the next leg to Calcutta. My ventral composure is so far maintained, but I do my best not to flaunt my well-being before my fellows.

The Allahabad landing area is cursed with a somewhat treacherous current, normally—as to-day—of about 7 knots but reaching 12 or 14 on occasions.

On the way to Calcutta *Camilla*, booming along at two or three hundred feet, scatters herds of buffalo, some white, others black, and sends them charging through the trees. Parts of the country might pass for Richmond Park—but you don't get tigers in Richmond and that I am sure, is what I see bounding from a clearing to be hidden by the trees. At least, it was one of the big cats. Another frightened creature looks like a big brown bear.

The soil is red and the country green. Sometimes we pass very close by verdant hills, cross a steep escarpment or sweep low over groups of huts, the natives apparently preparing their evening meal.

The sun is setting over the green, wet plain as we cover the last few miles into Calcutta, and lights are beginning to glimmer in the huts.

Calcutta—water and lights under the storm wrack. The Sunderland, having crossed India non-stop, is waiting for us as we touch down on the Hoogli, upstream from the Willingdon Bridge. It is quite dark.

Monday, July 25.—Water vapour streams from our airscrew tips just after take-off. We have been promised typical monsoon weather, though after a night's rest and with spirits buoyed by the early sun, no one seems to mind. There are tremendous cumulus clouds soaring up over the Ganges Delta, luckily leaving sufficiently large gaps through which to see the Sunderbunds, as the astonishing delta country is called. The most confirmed "doodler" could perpetrate no stranger patterns than those made by these snaking tidal rivers and their subsidiary channels dividing the swamp and forest-covered islands. This is the domain of the Bengal tiger and the haunt of the most loathsome reptiles. Thousands of square miles are uninhabited.

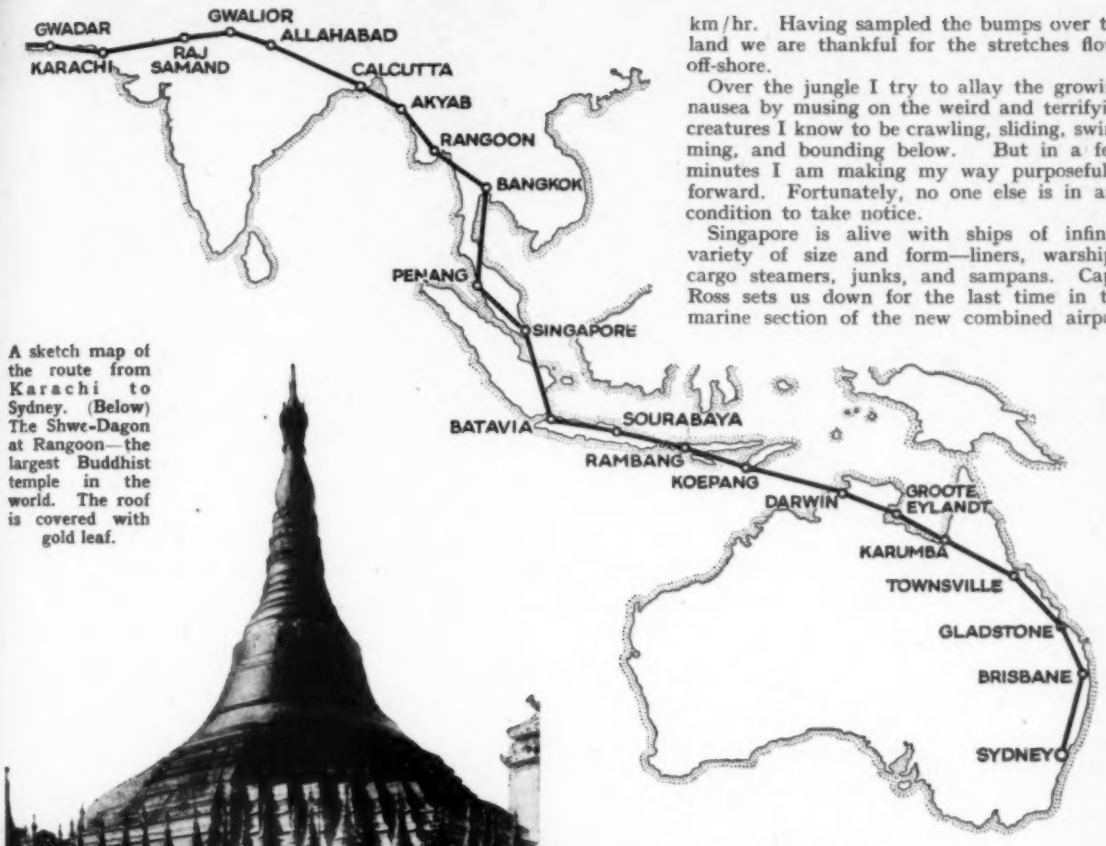
Now we are flying blind. The bumps are sharp and the rain streams fast over the window. Things clear a bit as we cross the Bay of Bengal to Akyab, a Burmese port depending largely on the rice trade. Reefs show black in the water; the waves wash in among the mangrove trees. We land alongside tree-fringed rice fields to be ferried across in teeming rain to the Inland Steam Vessel *Tanko*. Everything is hot, wet and misty.

The *Tanko* is one of those little shallow-draft steamers of the type which must have played a tremendous part in building the Empire. We relax, sweating and steaming, beneath her awning and fall into conversation with our radio operator, who tells us that we were homing on Akyab on the way in and that on the last stretch he had to be working with five stations, the Sunderland (now almost at Rangoon) and a Douglas D.C.3 of K.L.M. In sketching we find a mutual interest. On his trips down the Empire routes he has persuaded natives of all types to pose for him.

The bumps on the Akyab-Rangoon stretch are the worst yet. First Officer Giles, who is flying with us as a supernumary officer to get experience on the Empire boats, falls prey to a particularly vicious one as he steps up into the smoker for breakfast.

Inland now, across a great archipelago with Rangoon on its far side, bumping our way along at 146 m.p.h. over the mountains and the Irrawaddy Valley. Rangoon, capital of Burma, is distinguished from afar by the great

THIS article is the second of a series by a member of the staff of "Flight" who was sent to Australia to obtain first-hand information on military and commercial aviation in the Commonwealth, and to record impressions of travel on the long Empire route. Last week he described the outward journey as far as Karachi.



A sketch map of the route from Karachi to Sydney. (Below) The Shwe-Dagon at Rangoon—the largest Buddhist temple in the world. The roof is covered with gold leaf.

Shwe-Dagon pagoda, which is said to contain eight hairs of Buddha and to be 368ft. high. The roof is covered with gold leaf renewed voluntarily by the worshippers. Capt. Ross obligingly brings us past low and slow.

Sunderland L-2161 greets us again, riding very majestically on the busy Rangoon river. We assure the authorities that we have no firearms.

The Rangoon-Bangkok section takes us across the Gulf of Martaban; we meet the mainland again at Amherst, south of Moulmein, a teak and rice centre. Burma is separated from Siam by the Dawna range, which in due course gives way to the flat rice-growing districts with their practical irrigation system. We put down for the night on the Menam river in Bangkok, city of the Temple of Dawn, with its spire studded with fragments of pottery.

Tuesday, July 26.—Bangkok is a base for the Imperial Airways D.H.86s serving the Hong Kong route. Our own course is in the opposite direction, by way of the island of Ko Samui, or Kaw Samui, on to Penang, 580 miles away over the coastal lagoons and mountains of the Malay Peninsular. At the time of our crossing, conditions—featuring bumps and rainbows—are not such that we can see simultaneously the China Sea and the Indian Ocean, as is often possible, but as we glide in over the junks at Penang, off the coast of Province Wellesley, we are elated by the sun. Our average speed has been 145 m.p.h.

The Straits of Malacca are on our right as we fly low down the Malay coast with its rice-fields, rubber and pineapple plantations. Up high the wind is about 50 km/hr. Having sampled the bumps over the land we are thankful for the stretches flown off-shore.

Over the jungle I try to allay the growing nausea by musing on the weird and terrifying creatures I know to be crawling, sliding, swimming, and bounding below. But in a few minutes I am making my way purposefully forward. Fortunately, no one else is in any condition to take notice.

Singapore is alive with ships of infinite variety of size and form—liners, warships, cargo steamers, junks, and sampans. Capt. Ross sets us down for the last time in the marine section of the new combined airport built to handle heavy landplane and flying boat traffic. A flight of Vildebeest torpedo bombers from Seletar, the R.A.F. base, slips quietly over.

And so the Raffles and the Swimming Club.

Wednesday, July 27.—*Camilla* has been taken over by a Qantas crew. Both our pilots are captains in rank, though Capt. C. R. Gurney is in command, with Capt. R. A. Tapp acting as First Officer.

Their uniforms—white cap, dark shorts, tie and socks and white shirt with epaulets—puts the Imperial Airways pilots rather in the shade. Capt. Gurney was at one time with Guinea Airways, flying massive mining machinery in specially designed freighters, and Capt. Tapp has amassed tremendous experience in and out of Australia.

Up we go to 10,000ft. on course for Batavia over the myriad wood-covered islands and the Linga Archipelago, where we cross the Equator and are duly presented with a certificate giving the name of the machine, the latitude and longitude, and bearing the signature of Capt. Gurney. Imposing as this certificate is at first sight, the whole thing is marred by unnecessary biographical details of the artist.

We cut over a corner of Sumatra, but are flying too high to study any animal life which might be visible in the swampy jungle.

Batavia is just across the Java sea, or more strictly, the Sunda Strait, with its place of a Thousand Islands.

The cultivation round Batavia seems to be of very high order. Capt. Gurney is cautiously avoiding the prohibited areas in his approach to this wealthy, well-defended city.

Sourabaya, our night stop, is just over 400 miles from Batavia at the other end of Java. Our course is down the coast and coastal plain, with its rubber plantation and sugar canes.

Though we are at the Orange Hotel quite early we shall have an extra-early night and leave sight-seeing in this fine clean sugar city for the return trip.

(*Cont. overleaf.*)

Singapore, with its £210,000 base for landplanes and flying boats. It has a fine slipway and extensive servicing facilities.

Thursday, July 28.—We taxi out at Sourabaya as the crack of dawn admits the light. There is a phosphorescent glow in the water, especially under a wing-tip float now rapidly becoming tipped with light. The sunrise is vivid orange, the most beautiful I ever expect to see, but too obscured by *Camilla's* structure and changing too quickly to permit detailed description.

To-day we shall fly down that great sweeping tail of islands tapering off into the Timor Sea, with Timor itself like a barb on the end. These are the isles of gigantic volcanoes, of jungles, and enchanting islets fringed with jade. First is Bali with its 10,500ft. volcanic peak; then Lombok, which has a refuelling station at Rambang in the shadow of the Rijani mountain; and Sumbawa, with another towering peak and a miniature volcano with perfectly preserved crater in amusing juxtaposition.

How this stretch delights us, hurrying from cabin to cabin to tell each other of some new wonder. Mr. and Mrs. Edward Sterling, of Westport, Conn., who joined us at Batavia or Sourabaya ("toting" a wicked-looking crossbow from the Cambodian jungle), feel that their decision to go touring by air has been justified.

Now we are passing barren Komodo, only home of the giant lizards or Komodo dragons, which can run swiftly on their little straight legs and walk upright like human beings. Mr. Sterling advises us to see those in the Sourabaya Zoo on the way back.

At Bima the "reception committee" apparently wants to sell us cockerels, hens, locally made cloth, daggers and onions.

Flores offers us red and blue lakes. Here it was that Jim Broadbent was obliged to put down his Gull, landing on a narrow strip of comparatively flat ground. Capt. Gurney points out this spot and we think even more of Broadbent.

We are averaging 164 m.p.h.; with real Aussie enthusiasm we are informed that "these things do bat along if you shove 'em up high."

Koepang, on the Island of Timor, is the last stop before Australia. We see little of the island, but recall the story of Captain Bligh and the *Bounty*.

Then a nice sleep across the Timor, which is quite a common-looking sea.

Mr. Hudson Fysh, managing director of Qantas Empire Airways, has described Darwin as the sad Cinderella of Australia, still looking for her Fairy Prince. Backed by tropical growth, it has the air of a gold-rush boom town. There is no delay in getting us ashore (this criticism was made on the first through flight by flying boats), though on our way into town we have to be driven along a stretch of railway track. This, of course, is only a temporary expedient, and probably on the return trip we shall find that there have been improvements.

Passengers are guaranteed accommodation in the best hotel of every town used as a night stop, but I receive an invitation to spend the night at the Qantas rest-house, and, with prospects of meeting other pilots, accept without deliberation. But I do go into the hotel, and though chromium and concealed lighting is not evident, the comfort and cleanliness of the place seem reasonable enough—certainly for a one-night stay.

On the veranda of the rest-house, after a change and a square meal, there is a homely squeaking of wicker chairs and a round of introductions. The conversation is mainly aeroplanes, but develops (or declines) by way of aerial fighting tactics, to guns, game, reptiles, geography and cyclones. The met. officer calls in with his forecast and a few contributions to the discussion.

I crawl under my mosquito net in the knowledge that these Qantas pilots are as entertaining as they are skilful.

Friday, July 29.—We are out early under the Southern Cross, and are back on board, settled in the smoker, before the first streak of dawn marks the horizon.

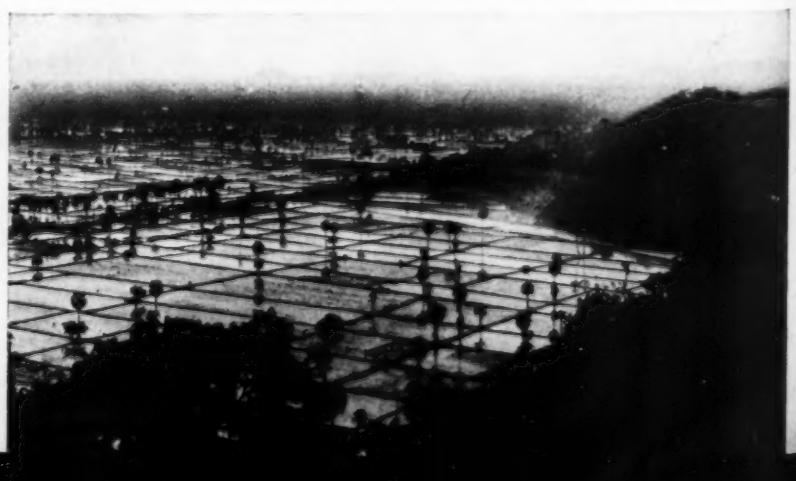
From the air we can see the glint of a river and the distant glow of a bush fire. As we cut across to Groote Eylandt a borrowed map shows us our position in relationship to such places as Skirmish Point, Crocodile Island, Mount Delight, The Annie and Blue Mud Bay. We land on a lagoon and are soon out for a blow in the launch. I recall reading something of the establishment of this remote station in *Aircraft*, our Australian contemporary. A party sent by the Shell Company had, among other things, to lay down a 1,500ft. submarine pipe-line from the 800-ton tank to the launch's jetty. Mosquito and fly-proof tents were essential for existence on the island, and equipment included kerosene refrigerators and petrol lamps.

Down Australia

Karumba, across the Gulf of Carpentaria, is another of the desolate outposts chosen as a refuelling point. We recall that the route we are now taking was surveyed in 1936 by an R.A.F. flying boat carrying Major Brackley, Air Superintendent of Imperial Airways, and Mr. Hudson Fysh.

Dried-up rivers, grass and trees characterise the Karumba-Townsville stretch. We are grateful for a little mild excitement in the form of a "record"—the flight clerk says we are doing 220 m.p.h. ground speed. Capt Gurney comes back for a cigarette and confirms this. Everything, of course, is in our favour; we are flying high, there are strong tail winds, and we are lightly loaded Nevertheless, we feel very proud of our *Camilla*.

We touch bottom while taxying in at Townsville, but there is no suggestion of sticking. (*Cont. on next page.*)



Typical rice fields of Southern Siam. Passengers in the Empire boats pass many similar scenes.

The superb harbour of Sydney, with Botany Bay at the top of the photograph and the famous bridge with its long approaches in the left foreground.

Townsville is a pleasant spot with a really lovely front.

Saturday, July 30.—There is further friction with the bottom of Townsville harbour as we taxy out for our last day's flying, but after a short delay we are off, banking over northbound *Circe* waiting to take off. We have real current Australian papers to read, and the mention of yesterday's fast trip is received with acclamation.

A new passenger is Mr. Wilfred Tyzack, not unknown to the aircraft trade as a director of W. Tyzack, Sons and Turner, Ltd., of Sheffield. Mr. Tyzack makes very extensive use of the airlines in his business "down under." Another newcomer is Captain Parnell, who commands a patrol launch at Darwin. He is coming down to Sydney to collect a new Thornycroft boat with a three-pounder and two Vickers guns to help persuade intruders that pearl poaching does not pay.

After refuelling at Gladstone, the time goes merrily to Brisbane, the unrivalled merits of which city are expounded at some length by the flight clerk. I subsequently discover that he is a native. Though we have some time ashore we can do nothing more than pace the quay.

The final five-hundred-mile coastal stretch to Sydney, with farm-dotted plains and hills stretching away inland, gives us glimpses of Australian agriculture

And now, through my window, which has framed for me many of the world's marvels, I see ahead a great and very wonderful city, its sheltered harbour dominated by an arch of steel. My mind recalls another bridge I saw nine days ago at Avignon and another ending here, as we glide down to Rose Bay, for I know that one day the England-Australia air service will be considered as a bridge. That bridge will have fewer spans than those we have made in the last few days, but they will be so high and the traffic so fast that travellers, unlike us, will see little of the wonders below

The Return

After a very memorable and instructive stay in Australia I boarded R.M.A. *Calpurnia* (Captain Orme-Denny) for the homeward trip. At Singapore I changed to *Cameronian* (Captain Long), passing into the hands of Captain Gurney (Imperial Airways and Qantas have a Gurney each) at Calcutta and Captain Attwood at Alexandria.

The route was essentially the same but we made different night stops—Allahabad (Gwalior is the normal halt for the return journey, but we had suffered delays), Sharjah (the fort near Dabai), Alexandria and Rome.

Ever vigilant for signs of wild life (in Sydney I realised a long-standing desire to see the koalas) I was rewarded with glimpses of sharks and great sting rays in the southern seas; of playful but none the less repulsive crocodiles in the Raj Samand reservoir; I saw the Komodo lizards in the Sourabaya zoo and struck up an all-to-short friendship with a baby wallaby at Karumba. This little fellow, when nursed, would lick one's face like a puppy. I shall not quickly forget my concern when, after my second Bols in Sourabaya, I saw *lizards* scurrying down the wall and darting under the pictures.

In my bare feet I wandered round the Shwe-Dagon, though my appreciation of its beauties was hindered through having continually to survey the ground ahead.

From Dabai creek I was rushed across ten miles of flat desert in a Ford V8 to a real P. C. Wren fort with a guard of a hundred Arabs. Mr. Whelan, who looks after things there for Imperial Airways, kept me quite enthralled by tales of the local activities, which vary from small-scale shootings-up to inter-tribal conflicts of respectable proportions. After vainly trying to win the confidence of some tame—or, rather, captive—gazelle (surely the most elegant creatures on earth) we had dinner under the stars with big, black scarabs inoffensively going about their business all around, and went inside to hear how Hutton was becoming public hero number one.

At Allahabad *Cameronian* was guarded at night by a Gurkha with his *kukri* and at Dabai by an Arab fondling an old Mauser automatic with holster stock.

From Sydney I had as a companion Mr. Charles Goldrei, a prominent importer, who gave me some convincing examples of the way air transport can help commerce; his business in Australia and New Zealand could not have been despatched had it not been for the speeded-up air service. He was so enthusiastic that, being associated with the confectionery business, he is having a big model of *Cameronian* made in sugar and placed on exhibition.

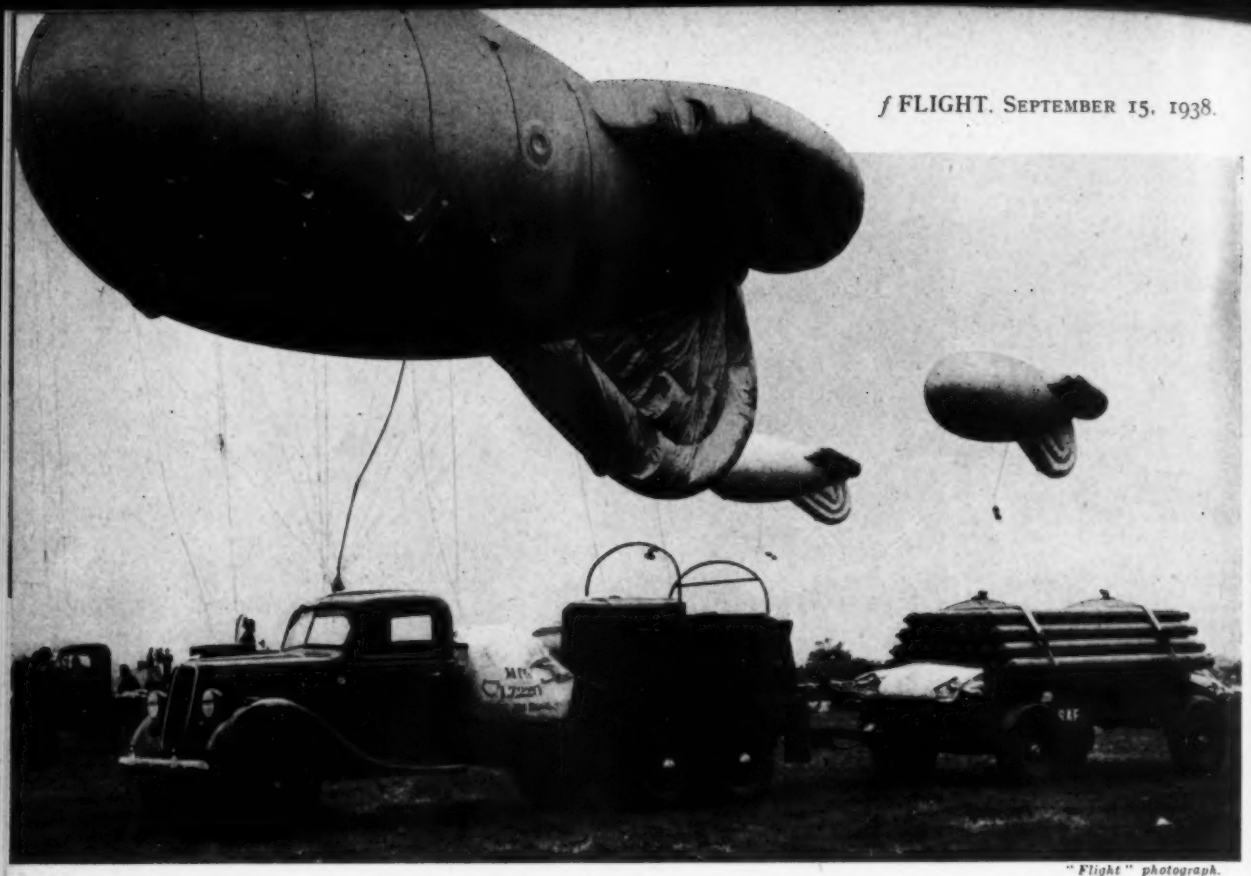
Other acquaintances were Captain Neill, of the Seaforth Highlanders, coming home from Hong Kong; Mr. Atkins, manager of a teak plantation in Burma; three Americans in the oil business at Bahrein; an American engineer who joined us at Athens; and a Jack Tar—a leading stoker, I believe—whose messmates had helped towards sending him home by flying boat on receipt of some grave news.

The only episode on the trip which might reasonably be called an incident was our approach to Akyab in some filthy monsoon weather. One bump took us up 1,100ft.

It was hopeless to attempt to get in, and as things suddenly began to get even worse Captain Long was obliged somewhat hurriedly to put us down. We must have touched the water at something over 100 m.p.h. Taking it green over the bows and with water swilling down the passage from the mooring hatch open for use as a forward look-out, we turned for Akyab. A line of rocks, a dorsal fin and a couple of gentle bumps on the bottom were received with more interest than concern.

After taxying for about an hour and a quarter we got into Akyab all rather thankful for this little relief from routine and radiating confidence in *Cameronian* and her Captain.

When we stepped back on the pontoon at Southampton we felt like patting that broad Alclad back out of sheer affection.



"Flight" photograph.

This photograph, taken during Sir Kingsley Wood's visit to Kidbrooke, gives a good idea of the "self-contained" nature of each balloon, with its winch lorry and gas trailer.

THE BALLOON BARRAGE

Good Progress Revealed at Inspection by the Air Minister : How the Balloons are Operated

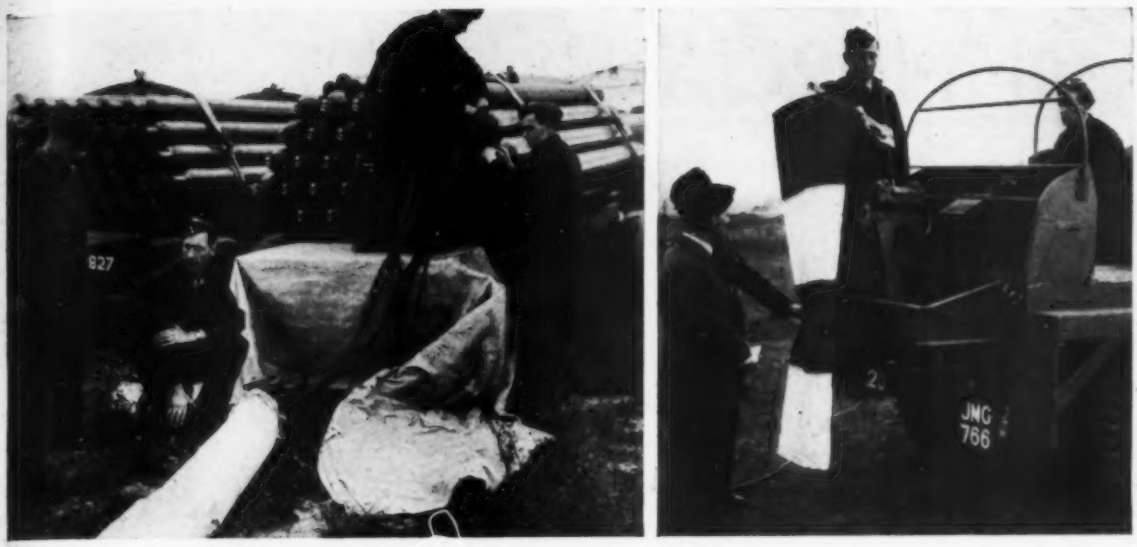
By MAJOR F. A. de V. ROBERTSON, V.D.

AIR COMMODORE J. G. HEARSON, A.O.C. No. 30 (Balloon Barrage) Group, in his lecture to the Royal United Service Institution last December, said, "A balloon barrage, as part of the air defences of London, is almost an accomplished fact." It is now accomplished to the point of being able to put up a show when the Air Minister, Sir Kingsley Wood, inspected Nos. 901, 902, and 903 (B.B.) Squadrons at Kidbrooke on Tuesday, September 6. A very instructive show it was, too, and the smartness of the Auxiliary airmen in handling the balloons, although they had only had one month's training, was most creditable.

As *Flight's* representatives emerged from the steep climb up from Deptford to Blackheath they were met by the imposing sight of seven balloons in the air. The sky was clouded over, but the balloons were new and their silvery dope showed up brightly. Seven balloons together looked a lot to eyes which had almost forgotten the War, but in due course the three squadrons at Kidbrooke will have 45 balloons apiece, while other squadrons are getting into shape round London, two at Hook, near Kingston-on-Thames, in Surrey; three at Chigwell, in Essex; and two at Stanmore, in Middlesex. It should not be long before we shall be able to reach the ideal of "field siting" 600 balloons over the London area—if that be finally considered the best way of disposing this latest factor in the air defence of the capital. Air Comdre. Hearson, in the paper alluded to above, showed a strong preference for

The Air Minister went in here— **—went round and round inside—** **—and came out here.**

"Flight" photographs.



(Left) Filling a balloon from the cylinders. A number of cylinders are connected up to the filling trunk. (Right) This view of a drogue being attached to the cable gives a good idea of the latter's comparative thinness.

field siting as against "perimeter siting," which latter term means arranging the balloons like a paling round the outskirts of London.

Sir Kingsley Wood, on arriving at Kidbrooke, first walked through the sheds of the three squadrons and saw the airmen engaged in learning knots, splices, and fabric work, and also inspected the travelling winches and trailers. Each squadron has an establishment of about 60 regulars as instructors and about 450 Auxiliary airmen. The Auxiliaries are on the same basis as the Auxiliary Air Force, that is to say, they are civilians who train in their spare time. The age-limits for recruits to the balloon squadrons are from 38 to 50, as it is not intended to enlist men who are fit for duty in more active forms of defence. Men under 38 may be accepted if they are not fit for ordinary enlistment in the Territorial Army or A.A.F. but are otherwise able-bodied. Candidates in receipt of disability pensions cannot be accepted. The men are required to attend for one evening a week from 7 to 9 p.m. and one week-end in three throughout the year, and also to attend for fifteen days' annual training. They engage in the first place for four years, which may be extended. Of course, they are liable to be called out for service in the event of general mobilisation. Expenses are paid, and nobody need be out of pocket by enlisting in a balloon squadron. Sir Kingsley Wood made an appeal for 5,000 recruits.

Mobile Units

Outside the sheds an envelope was partially inflated with air, and the Air Minister, having donned overalls, crawled through an opening and wormed his way inside where he could see the arrangement of the valve, the air ballonets, and the rip cord which will rapidly deflate the balloon in case of emergency. He then proceeded to the flying field and saw one inflated balloon walked out of its shed by its party. A "bed" had been prepared on the field, and there the balloon was tethered to bollards fixed in the ground. A balloon unit carries bollards and pickets with it on its trailer, and can prepare a bed where it likes—even, I was told, in the streets of London. The next step was to transfer the balloon from the bed to its winch. The mooring cable is wound round a drum on the winch lorry, and the loose end of it was made fast to a fixture which is attached to the underside of the envelope by a number of light cables. The ropes were then cast off from the bollards, the balloon was allowed to ascend to a height of fifty feet, and then was hauled down again by the winch.

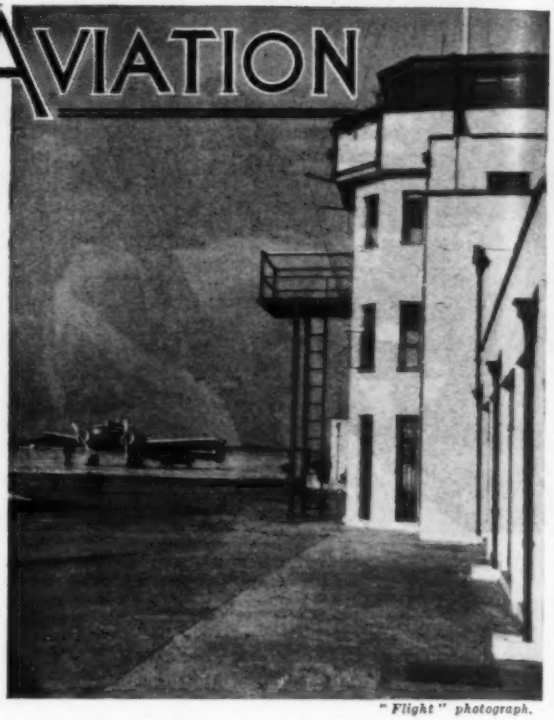
Part of the equipment of a unit is a trailer with about 30 cylinders of hydrogen. The next demonstration was inflating an envelope from these cylinders. Ten cylinders, each with its own pipe, were used at the same time, all the pipes being enclosed in a canvas tube. Meantime, one balloon had been allowed to ascend until it was hidden in the clouds, and only coloured drogues on the cable showed its whereabouts. In war, of course, the drogues would not be used, and the invisibility of the barrage in such conditions would be a terror to pilots of hostile bombers.

It does not seem to be understood by the general public that a balloon barrage is essentially mobile. Each envelope can be carried about deflated and neatly packed up on its lorry, and when the appointed position is reached a bed can be laid down, the envelope quickly inflated from the cylinders, and the balloon transferred to the winch and allowed to ascend. An enemy would never know where to expect the barrage. Of course, by day in clear weather it would be visible and probably vulnerable; but in such weather raiders would have most to fear from the guns and fighters. In dull weather and by night the barrage should have a strong moral effect, and should keep raiders up at a respectable height, thereby decreasing the chance of accurate bombing and reducing the amount of air which the fighters would have to search in order to intercept. Low-flying raids would be a parlous business when the balloons were up or were thought to be up.

The balloons used in the war, and afterwards for Army co-operation purposes, had a capacity of 35,000 cubic feet of gas, for they had to lift a basket with two observers and 80 lb of ballast. The barrage balloons, which carry no basket, have a capacity of about 20,000 cubic feet. At the tail each balloon has a horizontal stabiliser on each side and a rudder underneath. These are filled with air, which enters through a scoop as the balloon ascends. Inside each envelope is an air chamber called a ballonet, which is filled through a scoop underneath the nose. When the envelope is full of gas, these ballonets are empty, but when gas escapes, or is valved off, the ballonets fill with air and so keep the balloon in shape.

The fighting arm of a barrage balloon is the cable. The balloons are not interconnected by an apron of wires, as was the case in 1918. That apron reduced the ceiling by its weight, and made the balloons sag towards each other. The threat to the raider is that his aeroplane may hit one of the cables, and if it does so it is not expected to survive. No enemy pilot is likely to risk such a collision. As for the height to which the barrage can ascend, that is naturally an official secret. Obviously, it must depend chiefly on the weight of cable which a balloon can lift, and it is only natural to suppose that research is being conducted to find material for the cables which will be strong enough and yet lighter than the one previously used.

COMMERCIAL AVIATION



"Flight" photograph.

AS IT WAS: Just now considerable alterations are being made to the control tower at Heston for the accommodation of a larger staff of control officers. This is how it was before the alterations were started. In due course the whole of the terminal block will be removed and rebuilt, probably on the inner boundary of the airport where a railway feeder extension is being planned.

THE WEEK AT CROYDON

"A. Viator's" Stand-in Writes of Croydonites in the West Country, Odd Erections in the Main Hall, and QBI Transgressors in Disgrace

I HAVE been given to understand, on none-too-impeccable authority, that the denizens of Croydon need suffer no alarm if, in the course of the next week, they encounter a short, swarthy figure of Colonial complexion, limping around the passages of our premises, the figure in question merely proving that A. Viator is back in the fold. If you ask him how he fared he will probably grunt, and, exposing a forearm or hoof, mumble "Blisters, old boy, blisters," which would indicate that his son, D. Viator, permanently appropriated the *volkswagen*, and that Ella Viator had omitted to soap his socks daily before he wandered off the beaten track. Like a number of others he was in the West Country; my spies report that fine weather has been had by all down there.

Croydon visitors to that part of the world included Mr. Shell, who, not content with outwitting the octane, took tackle to tackle the conger eel, and such fishy stories you never did hear! Then they tell me that the original Brian Allen, of the Aviation Company of that ilk, having "Tipsy" inclinations, was seen doing a spot of high-speed navigation on two cylinders in a Brixham brigantine.

Lastly, a gentleman of the Croydon Customs has also returned from the Cornish coast. Possibly this gave rise to the confused report that basking sharks had been seen in that area.

Walking through our new hall, which is the continuation of the main hall, I perceived that Quirks and Gildings had apparently achieved the remarkable feat of balancing a wall in the middle of the floor. Closer examination proved it to be a kind of front of a new office backing on to the dividing wall of the two halls. For whom it is intended remains to be seen, but if we go on cramping our style like this we shall soon be charging visitors an extra 2d. on their 6d. guide tickets to extract them from our maze.

By the way, my reference to the glow-worm effect in the new nocturnal wind-sock as being effective is considered by some pilots as premature, to say the least; they tell me that, viewing it from the air, all they can see is one upward shining white light. It may be, however, that someone thinks that an approximation of the wind direction should be possible from the ground as well as from the air, which latter is clearly shown by the illuminated tee.

A friend of mine who has been in the game for some years, but is not himself a pilot, told me that he recently had occasion to spend an hour in the control tower at night. In consequence of this experience he is of the opinion that QBI transgressors, in addition to paying the fines mentioned a week or two ago, should be compelled to spend an hour in our control tower. By so doing, my friend thinks, they might obtain first-hand knowledge of the courtesy, trouble and fine judgment expended on their behalf by C.O.s in the course of their duties. Many pilots, chiefly private owners and those on pleasure bent, might also appreciate (*a*) the risks they run, (*b*) the risks they cause others by their ignorance in transgressing control regulations, and (*c*) the fact that control officers do prefer the word "assist" to "desist." Certainly I am inclined to agree that the law-abiding pilot knows the value of good control, whereas the private pilot too frequently regards a visit to the control tower as signifying that he is to be put on the mat and bawled out. If he could spend some time in seeing what the control officer has to deal with in the course of an hour during a normal uneventful evening, the experience would be one which would make him appreciate the very real assistance of Control instead of regarding it as an anathema in the nature of a racket.

TARMAC.

Mail Contract for N.-E.A.

IN Perth last Monday the P.M.G. announced that a new internal air mail service to London would shortly be inaugurated, and it is learned that North-Eastern Airways have been awarded the contract.

North-Eastern state that the first mail service will coincide with the announcement of their winter schedules on October 3. The new services will be as follows: Depart Perth, 9 a.m.; arrive London, 12.50 p.m., stopping en route at Newcastle, Yeadon (for Leeds/Bradford) and at Doncaster.

The Glasgow service will leave Renfrew Airport at 9.20 a.m. instead of 8.45 a.m. and call at Edinburgh, thence proceeding non-stop to Doncaster, arriving in London at 12.50 p.m.

The northbound service will leave London at 10.50 a.m., calling at Doncaster, Leeds/Bradford and Newcastle en route for Perth and at Doncaster and Edinburgh en route for Glasgow.

Air France's Le Touquet Service

TAKING stock of the first season's operation on their Croydon-Le Touquet service, run for the first time this year, Air France consider that they have done quite well. The service differed from that of two years ago, when London-Paris liners stopped at Berck. Air France have been running a special five-times-a-week return service between Croydon and the new Le Touquet Aerodrome, using Golden Clipper ten-seaters displaced from the London-Paris service by the new Bloch 220s.

About 50 return services were run from Croydon, including five services weekly during July and August and over the Easter and Whitsun week-ends. Altogether, 400 passengers were carried, the July number doubling itself in August as the service became better known. These results should ensure that the service will be repeated next year.

A NEW BLIND APPROACH SYSTEM

Towards "Last-moment" Accuracy

EVER since the American Bureau of Standards carried out its original blind approach experiments some five years ago, the principle behind the various systems which have been used, experimentally or otherwise, has been basically similar. All have depended upon radio beams to give the pilot the necessary glide path guide.

In a new system, known as the "three-spot," which is now being developed in America by Mr. Irving Metcalf, of the Bureau of Air Commerce, with the help of the M.I.T., the entire problem has been approached from a rather different direction. In its simplest form the Metcalf system involves the use of three lights arranged as the angles of a triangle which may be considered as the "landing reference plane." Two of these lights would be suspended on either side of the beginning of the runway at the height at which the machine would be coming in, while the third light would be on the surface of the aerodrome.

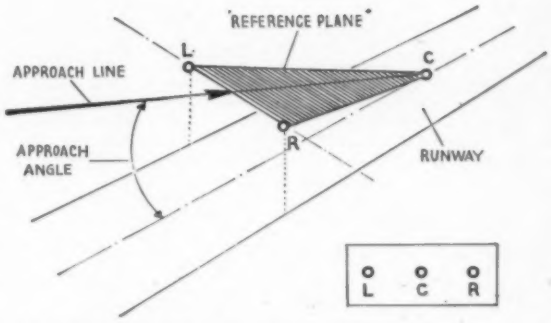
Needless to say, lights cannot be used for blind approach assistance, and this arrangement is suggested only as a means of visualising the basic idea behind the new system. If one imagines the appearance of these lights as seen by the pilot when approaching the landing runway, it is obvious that if the three are laterally in line and evenly placed the machine is on the correct line of approach. If the centre light is below the two outer ones, then the machine is below the correct line and vice versa; while if the centre light is to the right or left of its proper position, so the machine is to the right or the left of its approach line. The idea is, briefly, the theorem in plane geometry, which says that three points can determine the position of a plane, and in this case the plane is that of "landing reference" inclined to the aerodrome surface.

Beam "Horns"

In practice the place of the three lights would be taken by electrical radiation, providing exactly the same effect and, through the medium of a suitable receiver, giving the pilot much the same kind of picture. After due consideration the infra-red idea was ignored, and it happened that at the time of Mr. Metcalf's original experiments a new method of propagating extremely short radio waves had already been developed. This method involves the use of what can only be called trumpets, which direct the beam in exactly the same manner, theoretically at least, as in the case of sound.

By employing horns of different cross-sections, different beam shapes can be obtained, and in the proposed system four beams will establish two overlapping regions, one for vertical and one for horizontal directivity. Work has already been carried out on the development of suitable types of transmitters, using a wavelength of 50 cm.—*i.e.*, a frequency of 600 megacycles. Apparently the wave patterns have turned out to be very much those which were theoretically predicted. In final form the aircraft receiver would show, on a fluorescent screen, a picture entirely similar to that of the three lights which have been used as an example, though the two outer marks would be controlled by the gyroscopic instruments. For initial approach assistance marker beacons would be used in conjunction, as usual, with sensitive altimeter readings.

The new system, which has not yet been tried out in practice, does seem to provide a possibility that the last and critical part of the approach may be more accurately gauged. At present this part is in the hands of the pilot. Hence the fact that blind approaches are still not made unless there is a reasonable degree of visibility near the ground.



The Metcalf "three-spot" approach system shown diagrammatically. When the machine is on its correct approach line the pilot would see a picture such as that on the right. Movements of the three spots in relation to one another would give a perfectly clear indication of any deviation in any plane from the correct line.

Swansea-Weston Line to Keep Going

THE service connecting Swansea, Cardiff and Weston-super-Mare, inaugurated by Western Airways on July 27 last, has been so successful that, although it was originally intended to close on September 19, it will be extended right through the winter. The present daily service will be replaced, as from September 19, by a twice-weekly service, to be run on Mondays and Fridays, and providing two through connections in each direction on each of those days.

In connection with this service Straight Corporation has taken a lease of Jersey Marine, Swansea, which is centrally situated for Swansea, Neath, Briton Ferry and Port Talbot and, it is stated, serves the district better than any other airport site. Further developments planned include the establishment of an Air Guard flying training school.

To Switzerland This Winter

DURING the coming winter season Imperial Airways will be running a service in conjunction with that of Swissair for part of the period. It will be operated on week-days until October 29, and then again—daily in this case—from December 15 to March 31.

Swissair will, of course, run throughout the season, and from December 18 to March 31 the service will be run every day.

Subject to weather and such circumstances, Swissair will also run an "on request" service between Zurich and St. Moritz, where the Samaden airport will be used. Earlier this year (in the issue of February 24) *Flight* described some experiences on an experimental service to Samaden, but it was obvious then that this service could not be operated with absolute regularity since, with or without radio facilities, reasonably good weather is an essential to safety in and over the Engadine.

More Trouble in China

AFTER the attack on the China National Douglas, the Sino-German Eurasian Aviation Company suspended their service between Hong Kong and Hankow. A week later, on September 6, one of this company's machines was also attacked by Japanese fighters while flying from Hong Kong on the Yunnan service.

The attack was made near Liuchow, and according to reports the machine escaped by virtue of its superior speed. Nevertheless several bullets pierced the wing covering and a fuel tank was holed. The pilot made a forced landing.

The wreckage of the Douglas was brought back to Hong Kong early last week and, despite the Japanese assertions that no attack was made, the wreckage was fairly well riddled.

Iced Take-offs

DURING the past year or two quite a few accidents and incidents have been caused by the fact that pilots have taken fully loaded transport aeroplanes off with either snow or ice on the wings. In the first case the snow may be in a semi-melted state, and may be considered to be harmless, but in fact the rapid evaporation during and after the take-off causes this snow to form solidly as an irregular mass of ice, with an obviously unpleasant effect on the aerodynamic characteristics of the machine.

A *Notice to Ground Engineers* has recently been issued by the Air Ministry in which the danger even of a deposit of hoar frost on the wing surfaces and the airscrew blades is pointed out. It is explained that unless the aerodrome is a large one and the pilot is prepared to make a longer run than usual and to expect a somewhat higher stalling speed, this deposit should be removed before the machine leaves the tarmac. An additional sentence reminds the ground staff that metal airscrews, particularly those with magnesium blades, should be dealt with carefully.

COMMERCIAL AVIATION (CONTINUED) : WORLD NEWS

Survey Replacement

ROLLASON'S have recently completed an interesting conversion job at their Hanworth workshops—the installation of survey equipment in a D.H. Dragon for Air Travel and Survey Pty., Ltd., of Sydney. The machine is to replace the one which was wrecked at Croydon last March, and it is now ready to be flown out to Australia. The equipment includes special Marconi radio apparatus, Williamson cameras, and a P.B. auto pilot capable of being linked for automatic homing control by radio. There is a fully equipped dark room on board.

Rollason's Hanworth shops, incidentally, are busy servicing several Swallows and making spares for these and other B.A. machines.

Far Eastern Change ?

THERE is a possibility that K.L.M. may eventually alter their Far Eastern route in order to shorten the overall time taken by the services. The idea is that the new route might be via Madras, Colombo and across the Indian Ocean to Medan —a change which may save as much as two days in the overall time of the journey from Amsterdam to Batavia.

The probability or otherwise of the scheme depends, of course, entirely on the improvements which are made to Ratmalana Aerodrome. In the meantime the Department of Civil Aviation in Ceylon is not ready to consider extensions without definite assurances from the airline operating company or companies concerned. Improvements to the approaches and to the runways are, however, being made.

The Department is also considering the possibilities of a direct air service from Mombasa to Colombo and on to Singapore. This is, of course, virtually the often-discussed reserve air route to the East.

The Boeing Out Again

TOWARDS the end of August, as recorded in last week's issue, the Boeing 314 flying-boat reappeared on the second stage of its test programme. The first stage, which involved 250 miles of surface taxying and the usual take-off and flying tests, showed that the boat was generally satisfactory, but modifications have been made to improve the characteristics in certain respects. Twin rudders, for instance, have replaced the single rudder which was originally fitted, and these lie directly in the slipstream of the two inner airscrews, so that maximum control is available for water manœuvring. Additionally, the angle of the sponsons has been decreased to improve the lateral stability on the water. It is possible that a central fin will be added to the tail assembly.

This machine is the first of a fleet of six which are being produced by Boeings for Pan American Airways' Pacific and Atlantic services. The second of the series should be out towards the end of this month and the hull of the third is ready to go to the dry dock as soon as this is vacated.

Pluna Extension

EARLY last month a Pluna D.H. 86B, flown by the Paraguayan pilot Nudelman, visited Asuncion, partly by way of a survey of the proposed service between Montevideo and Asuncion which may be operated by the company.

Among the passengers on this trip was Group Captain Primrose who was in South America on the British Airways mission there. It is suggested that the new service will be timed to fit in with the British Airways South Atlantic timetable—though this is looking rather far into the future, since British Airways are not likely to be flying across the South Atlantic during the next twelve months. The 86B spent two days at Asuncion, where a number of local notabilities and others were taken for flights over the city.

A Year in Siam

THE Aeriel Transport Company of Siam last year flew more than 8,000 miles and carried 64 passengers and nearly 36,000 lb. of mail and freight—which, using a fleet consisting only of three D.H. Puss Moths, can be considered as being very good figures. All the scheduled mail services on the Nakorn Rajasma-Nong Khai and Bangkok-Nakorn Panon runs were completed, and there were no forced landings or accidents.

At the annual general meeting, which was held in Bangkok on June 30, the chairman explained that the Director-General of Posts and Telegraphs had asked the company to consider opening two new international air mail lines, one to the north and one to the south of the country. Already the company has agreed to maintain eleven civil aerodromes and two modern bases.

Empire Route Fares Cut

IMPERIAL AIRWAYS announce important reductions in fares and freight rates on the routes to India, Malaya, Australia and Hong Kong. They will operate from October 1.

The reductions affect fares to destinations east of Karachi, but fares *from* all stations west of Karachi to stations affected are adjusted roughly in proportion.

For example, the present London-Singapore single fare, £156, is £26—20 per cent.—above the new rate. While it has not been found possible, state Imperials, to reduce the London-Rome or the London-Alexandria fares, the proportionate reduction reduces the Rome-Singapore fare by £27 and the Alexandria-Singapore fare by £28.

Other reductions, governed by operational and other factors, vary. The return London-Australia fare is down £14, to £274. The single Sydney-London is down £20 (Australian), to £180 (Australian).

Simultaneously, there has been a substantial scaling-down in rates for freight and excess baggage. The freight rate from London to Sydney, for example, is reduced from 23s. 11d. per kilogram to 16s. The rate to Singapore is down 2s. 7d., to 13s.

ANOTHER GERMAN TWIN : The new Siebel Fh. 104.A, which is fitted with two Hirth V8 engines, flew on September 1 from Berlin to Croydon, Paris, Rome, Bucharest, Warsaw, Stockholm and back to Berlin in a few minutes more than the twenty-four hours. The machine, in normal commercial form, carries five passengers at a sea level cruising speed of 186 m.p.h. Needless to say, it has a retractable undercarriage and trailing edge flaps. The Fh. 104.A was also the winner of the third Raduno del Littorio held last July.

PRIVATE FLYING

JUNGMEISTERFUL AEROBATICS: A Bücker test pilot, Arthur Benitz, has been touring South America with a Jungmeister and a Jungmann, and has given some 85 demonstrations. This lively aerial impression may be regarded from almost any angle.

Topics of the Day

Flaps Again

NOTHING is ever quite so simple as the academic theorists would have us believe. The other week I remarked somewhat querulously that one particular and quite competent designer of light aeroplanes could find no reason for the apparent loss of height which occurred when flaps are raised either after the take-off or during the approach.

Practical experiment certainly suggests that this loss of height is very real indeed, and the other day I was flying in a machine which, as the flaps were raised, automatically altered trim to counteract this loss if, in fact, it was nothing more or less than the result of a simple change in fore and aft attitude. The sinking effect was very pronounced, and nobody is going to tell me that it was pure imagination.

In order to explain the effect, it is probably necessary to throw away all straightforward and academic ideas on the subject. It would be quite reasonable to suppose that the effect of raising the flaps would be, momentarily at least, that of altering the whole of the airflow over the wing near the flap. This airflow may be considered to have settled down with the flaps in the fully down or half-down position, and for a moment after retraction the airflow is, so to speak, all of a muddle. To suggest an extreme case it may even be that at the moment of raising the flaps the whole lift over the centre section disappears because of the disturbance. I offer this for what it is worth.

Certainly airflow can do the most extraordinary things. In one medium-sized transport of my acquaintance the effect of raising and lowering the flaps causes the airflow whistle of a radio mast *above* the fuselage to be completely changed in note. Apparently the airflow within a very big cubic area is being entirely altered. Who can therefore be surprised if flap movements, when these are made suddenly at comparatively low speeds, produce the most extraordinary and sometimes dangerous results. Obviously, we have a great deal to learn about such things.

The New Technique

WHILE on the subject of flaps it may comfort those with old-fashioned ideas to know that a technique of forced landing approach with the modern type of aeroplane has not only been developed, but is becoming part and parcel of the experienced pilots' routine. When the flapped low-wing aeroplane first arrived, everybody complained that the days of the safe forced landing were over, and that it would in future be necessary to pin all one's faith on engine reliability. Earlier this year, a lecturer to the R.Ae.S. made a point of this in his plea to the designers to put the brake on development along present lines.

In general, this lecturer—who is an experienced pilot of modern aeroplanes—was perfectly right, and had the sympathy of all pilots who are flying for their living. But the fact remains that necessity has been the mother of technique, and nowadays a great many pilots feel almost as safe with a single-engined high-efficiency machine designed according to the modern formula, as with the good old side-slipping biplane contraption.

The great thing seems to be to maintain your speed until the moment when it is definitely not needed, and always to leave some of the flap movement to provide final resistance during the last part of the approach. In other words, the first part of the approach is made either with the flaps up or down only slightly, and at an air speed which is a good 25 m.p.h. higher than the normal stalling speed of the machine.

During the last part of the approach, which is made with plenty of height to spare, a little more flap is applied while the position of the machine in relation to the aerodrome or field boundary is carefully watched. At the moment when the pilot of the old-fashioned machine starts his slip to get rid of the final hundred feet or so, the flaps are pulled on to their maximum angle and the machine is more or less pushed into the chosen area. With an ample flap area reasonable excess speed is of small account, and to overrun a small field is, in any case, of no great moment. A tricycle undercarriage, in any case, seems to offer a good deal of relief in this matter of steadily increasing wing loadings. Unless the machine has air-brakes or flaps which can be used as air-brakes, the important thing is to leave always a last reserve of flap movement during the approach.

Thermals

IT may be the product of a very small experience of dual in two-seater sailplanes or merely of dealing with quite a number of small and somewhat under-powered light aeroplanes, but nowadays I seem to be a good deal more sensitive to up-and-down-currents, particularly during an approach into a small aerodrome where height and speed must be gauged with fair accuracy. This sensitivity can be very useful when the reserve of power is small, and one rather gets into the habit of flying over areas which are known to deliver up-currents.

At one of London's airports, for instance, there is, when coming in from east to west, a most pronounced up-current which is followed, just when one is wondering how the excess height can be removed, by an almost equally pronounced down-current. I doubt if, a year or so ago, I should have noticed these effects at all. One or two other pilots have had the same experience with light aeroplanes in that area, so it is not likely to be entirely the result of imagination.

(Concluded near foot of next page.)

Private Flying

FROM the CLUBS and SCHOOLS

LONDON

FOR last week 132 hours were flown and Mr. G. E. Richards made his first solo. Mr. B. M. Watt completed the tests for his "A" licence and several new members joined.

READING

The Hawk Major with a Menasco engine has been added to the club fleet. Good work was done by F/O. Porteous when he flew in the Cardiff race and came in fifth. Mr. Liedent is practising on the Whitney Straight before taking delivery of his Monarch.

ROMFORD

From September 5 to the 11th a clear total of 52 hours was flown as dual instruction. It is proposed that Mr. Ben Lyon and Miss Bebe Daniels will visit the aerodrome to see the C.A.G. members and their machines next Sunday.

ISLE OF WIGHT

The favourable weather conditions over the week-end helped to increase the flying hours and Capt. Sykes-Wright made his first solo. Mr. P. Taplin is now the club instructor. Preparations are being made for the C.A.G. recruits, some of whom started training on September 1.

EDINBURGH

Twenty-six hours' flying, which included a first solo by Dr. Rose, made up the week's activities for September 2. Club aircraft took part in an A.R.P. demonstration at Harthill in the role of enemy raiders on August 27. C.A.G. training was commenced and a solo flight by Mr. G. L. Wood, who thereby renews his "A" licence, made the proceedings official.

BARTON (BEDS)

The Bedford School of Flying has now purchased its fifth machine in the form of another Gipsy Moth, and excellent flying times are maintained owing to the good weather. A dance, held on September 7, proved a well-attended success. The aerobatic display which was postponed recently will now take place on September 18. Nine new members joined last week.

REDHILL

Flying for the week ended September 11 amounted to 167 hr. 30 min. with the Leopard, Fox and Gipsy Moths away for the week-end. The addition of a new Puss Moth and two Gipsy Moths is anticipated during the week. Twelve new members were welcomed. In the C.A.G. section seventy recruits are under instruction. Three new instructors have been engaged and the foundations of the C.A.G. building are already laid. Two further machines will be in use next week.

SOUTH COAST

The winners of the Bellairs Challenge Cup, the competition for which took place in August, are announced. Mr. W. H. Anderson took first place, with Mr. J. J. Dykes and Mr. J. White second and third respectively. Mr. J. White deserves special mention, as he received his "A" licence on his seventeenth birthday. The C.A.G. is well launched and a selection of candidates who have had previous flying experience will commence *ab initio* training as soon as they have passed their medical examination. Two of the South Coast machines will assist in the defence of the Eastbourne Flying Club Dawn Patrol on September 18.

C.A.S.C.

During last week members flew 22 hr. 40 min., but the cross-country flight proposed for Sunday had to be cancelled owing to bad visibility.

MARSHALL'S

Cross-countries to Oxford and Wittering were included in the flying total of 70 hours for the week ended September 11. Miss Ram was a new member.

HANWORTH

The club flying total of 76 hr. 35 min. did not include the 130 hours logged by C.A.G. members last week. Mrs. Griffiths obtained her "A" licence and Mr. Harold Cochrane carried out his first solo. Mr. Marshall Robertson has now returned from Africa in the club Leopard.

YORKSHIRE

C.A.G. flying is now in full swing and all five instructors are kept busy from dawn to dusk. It is hoped that delivery of the new Tipsy aircraft will take place during this week. The total flying for the month was 90 hours, 64 hours of which were flown last week.

HERTS AND ESSEX

For the fortnight up to September 8 266 hr. 47 min. were flown and Messrs. D. Nestle, W. J. Clark, and Ivor Morgan made their first solo flights, while Messrs. D. Hawxby and W. J. Clark completed "A" licence tests. Mr. M. O'Donovan has now taken up the duties of assistant instructor to the club and C.A.G. flying is in progress.

CINQUE PORTS

Mr. A. D. Walker completed his first solo last week and the club flying log showed a total of 87 hours. A very welcome visitor to the club was Mrs. Evelyn Seversky, from America. Fourteen *ab initio* pupils under the C.A.G. scheme are taking instruction and two have already gone solo. Instruction begins at 7 a.m. and continues until sunset and several new "A" licences are anticipated in the early future.

BROOKLANDS

A whole list of instructional achievements is headed by a first solo flight by Mr. E. Maunde. Messrs. J. G. Trilling, T. S. Lucas and R. Plaistow feature for completed "A" licence tests. Miss Mona Friedlander, who only this year obtained her "B" licence, now carries an instructor's endorsement, and Mr. Tony Spooner, who also obtained his instructor's endorsement, is taking up a position at Liverpool.

NORFOLK AND NORWICH

The Public Schools Aviation Camp has proved an unqualified success and all the boys have obtained their "A" licences under the instruction of the Baron de Bariguy and Mr. Norman Brett. The weather was not all to be desired, but this speaks even more for their enthusiasm. Several long flights were made in the gliding section both in the Kirby Kite and the new Nacelle Dagling trainer. In the power section an additional Moth has been purchased. Messrs. E. B. Brooks and E. Steward Anderson have passed the tests for their "A" licences.

Topics of the Day

(Concluded from previous page.)

One must give all the credit to sailplane pilots, their conversation, and, all too rarely, the articles which they have written, for the fact that the existence of thermals and so forth is known at all. If we had never seen what they really can do with engineless machines we might never have believed that thermals had any real existence. They are, admittedly, very small as a rule, and can only be noticed in lightly loaded machines, but occasionally one comes across really phenomenal effects. Anyone who has flown immediately underneath a thundercloud will know how violent the upward movement can be, and on occasion it is necessary to stuff the nose hard down in order to prevent the machine from being sucked up into the cloud. Again, there are times when, during a descent through holes in a cloud layer, one finds it necessary to pass through the lower edge of one of the cloud masses. It always seems that the machine remains in this lower edge of cloud for an unreasonable length of time. I feel fairly certain that the machine is actually gaining almost as much height as it is losing, and that the "long" period of blind flying is not just an illusion born of nerves and instrumentitis.

INDICATOR.

Reward

ONE way and another, and after a good deal of patient effort, Foster Wikner Aircraft are starting to see some gratifying results. A Wicko monoplane has already been sold to the Cardiff Club, and another has been ordered by the Bristol Club, while the first of an order for New Zealand trainers has recently been completed and been shipped out to the company's representative in that part of the world.

It will be remembered that the Wicko has a full aerobatic C. of A. and can be used for all types of training.

Egyptian Eldorado

IT is reported that the Minister of Finance, at the request of the Minister for War, has introduced a number of measures for the encouragement of civil flying in Egypt. In future, aircraft, parts and fuel for private flying will be allowed into the country free of duty. Repairs will be carried out free of charge in Government workshops, while garaging of machines in Government hangars will be permitted, and will be free. In addition, landing charges of Government landing-grounds will be abolished for private pilots.

FOR the C.A.G.

The Chrislea Monoplane Described

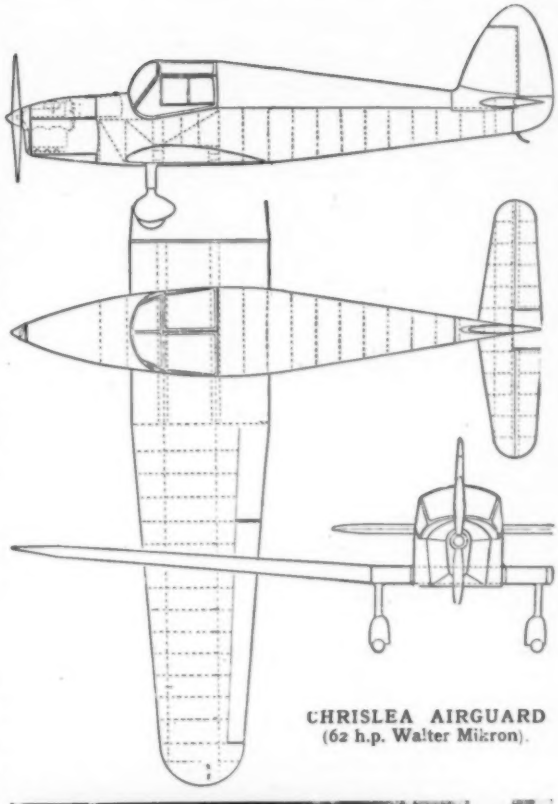
(Illustrated with "Flight" Photographs)

SINCE the announcement of the Civil Air Guard scheme many problems have faced the clubs, chief among them being that of providing suitable training aircraft. It almost seems that the designer of the Chrislea Airguard might have had this very point in mind when he first drafted out his ideas many months before any hint of C.A.G. was even whispered in the dovecotes of Kingsway, for from many viewpoints the Airguard is a most suitable aeroplane for the purpose.

From the outset, Messrs. R. C. Christoforides and B. V. Leak manfully attacked the problem of evolving a small-engined machine which should be simple and accessible, while at the same time having the comfort and robustness of an aeroplane with double the engine capacity—all this to be achieved without noticeable sacrifice of performance. The result now waits at Heston, where it is practically ready for the Farnborough and Martlesham tests.

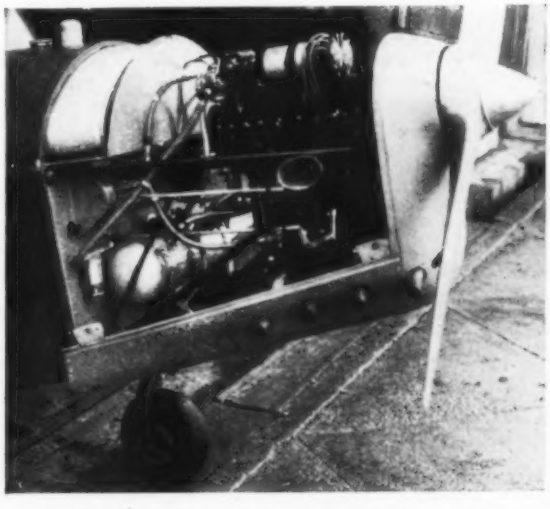
As a prototype the Airguard is most interesting. Briefly, it is a side-by-side low-wing cantilever cabin monoplane, powered by a Walter Mikron II 62 h.p. four-in-line inverted engine. The fuselage is of torsion-box construction from the tail to the rear of the cockpit. It has four spruce longerons, the whole being ply-covered, with vertical spruce stiffeners. For the cockpit the two top longerons are carried on and "broken" to drop several inches, so that the view out of the cabin is considerably enhanced. The decking of the fuselage is a separate component, and may be regarded as a fairing for the cockpit. It is of light ply construction.

The cabin gives ample accommodation for two people and provides an excellent view both forward and downwards. The two side windows are so placed that it is a simple matter to look not only out but also back without having to crane one's neck, while a "skylight" is also provided. Behind the seats is a locker for baggage up to 40 lb.

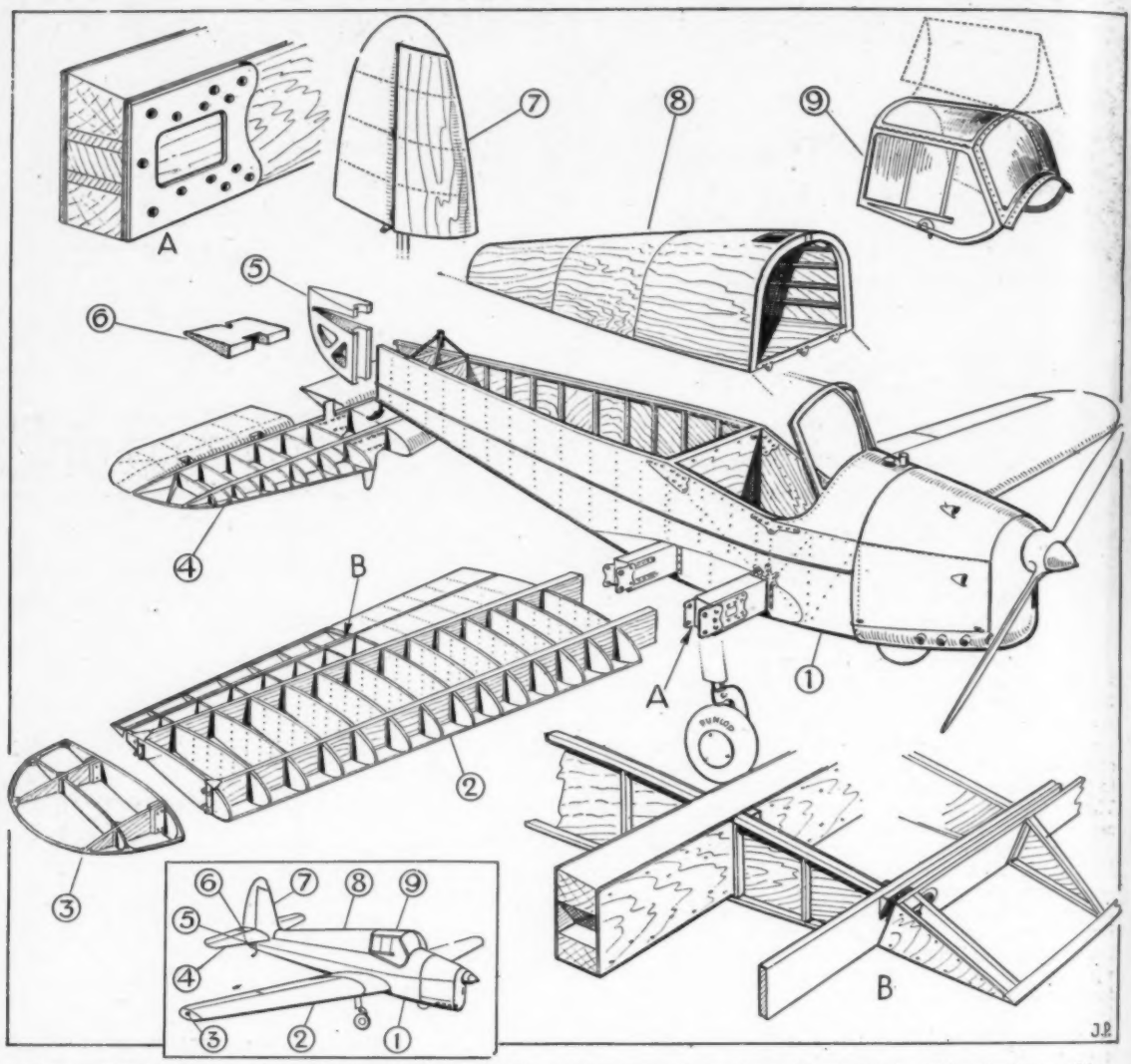


CHRISLEA AIRGUARD
(62 h.p. Walter Mikron).

By means of ply-covered balsa, the fuselage is faired off to the extremity of the rudder.



A fully braced mounting is provided for the Walter Mikron engine. Normal crankcase stresses are avoided.



This "exploded" drawing of the Chrislea Airguard, and the accompanying key, shows the simplicity and robustness of its construction. The drawing indicates how many of the units can be quickly detached and replaced.

Controls are simple. A central stick is fitted, with a low-geared tail trimmer. The rudder is operated by dual pedals, one pair of which is detachable. The control system is operated by cable and rod, with no pulleys in either the aileron or elevator controls.

The wing is assembled in three sections or, to be more accurate, five, if the detachable wing tips are regarded as individual units. The centre-section is built up round two parallel spruce box spars, which rest on top of the bottom longerons and are cleated to the vertical members of the cockpit walls. High-tensile steel plates with dural bolts provide a basis for the attachment of the wings and also the mounting for the undercarriage. In future models a universal joint will be fitted on the rear spar roots so that the wings can be pulled back and turned vertically before swinging them back to rest on the tailplane.

The Wings

The wings are of Clark Y section and have box spars with stiffening diaphragms at frequent intervals. The spars taper both in plan and thickness to the tips. Plywood ribs with light vertical stiffeners are used, and the whole wing is ply-covered. Two plates with two bolts apiece secure each wing tip to the main spars.

Simple three-position manually operated flaps are fitted on each side of the fuselage and extend out to the ailerons.

The tail consists of two solid spruce spars, ribbed as in the wing and ply-covered. The tailplane is built in two halves and linked by two dural plates which extend down the bulkhead of the fuselage. The elevators are interconnected with a steel torque tube with central lever. A steel quadropod, of tubular construction and bolted to the top longerons, forms the base for the tail fin.

The undercarriage is of the simple half-fork type, employing eight rubber buffers under compression. The rebound is taken on one buffer, with a split fibre bush bearing on a conical shoulder to serve as a check. The leg, attached to the piston, is keyed in two places. An interesting feature of the undercarriage is that one leg can be detached from the main spar and replaced in less than thirty minutes, by the removal and subsequent re-insertion of two spar bolts.

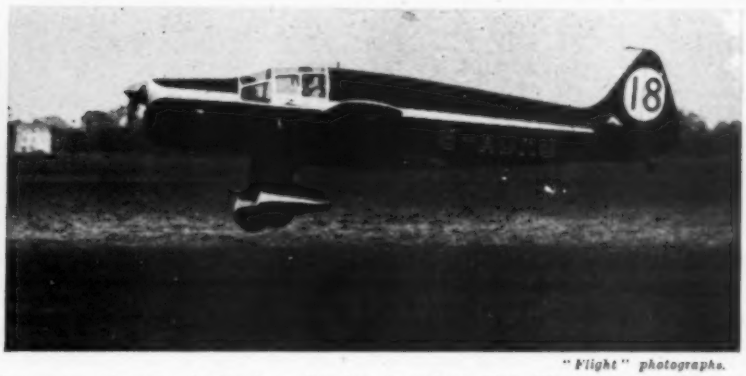
Finally, the Walter Mikron engine is carried on a fully braced mounting which obviates crankcase stresses.

On its initial tests, it is stated, the Airguard attained a service ceiling of 15,000ft., fully loaded. Its maximum cruising speed was 110 m.p.h., with a safe range of 375 miles. The span is 36ft., the overall length 21ft. 6in., and the height, 6ft. 3in. With flaps, it is claimed, the Chrislea can be landed at 40 m.p.h. The price of the machine, delivered at the Chrislea Aircraft Co., Ltd., Heston, is £550.

SPEEDY SEXTET

Only Six Starters in London-Cardiff Race, but a Good Finish

F/O. Geoffrey de Havilland and the T.K.2 (seen taking off from Heston at the start) in which he won at 187.5 m.p.h. from scratch. This is the T.K.2's third Cardiff Race win.



"Flight" photographs.

WEATHER conditions last Saturday were almost ideal for the eighth London-Cardiff Air Race. Good visibility, a light northerly wind, and clouds not lower than 2,500ft.—well, what more could a competitor have wished for? The race had attracted eight entries, but two of these, Capt. Percival and A. Henshaw, were non-starters. In some ways this was unfortunate, for these two pilots, with their Percival Mew Gulls, would have been the fastest pair in the race.

However, the disappointment was counterbalanced by an excellent finish in which the first four crossed the line within two and half minutes of the winner, F/O. Geoffrey de Havilland, in the T.K.2.

This year the course for the race was slightly modified. Starting from Heston, the competitors were required to fly direct to Cardiff and to continue on to Porthcawl. From this point they then proceeded to the Jersey Marine Airport, Swansea, before returning for the finish at Cardiff. In other words, a 77-mile triangular circuit was added to the straight stretch from London to Cardiff.

The first man to leave Heston was R. L. Porteous in the Hon. A. W. H. Dalrymple's Chilton. He was despatched at 14.32 hours. Nearly forty-one minutes separated the Chilton and the T.K.2, which had become the scratch machine.

At the Cardiff Municipal Airport a huge and enthusiastic crowd, ably marshalled by a veritable army of police officers, waited expectantly for the competitors, who were due to pass overhead on their way to Swansea *via* Porthcawl. While they waited, Mrs. Winifred Crossley went up to give an impromptu, but nevertheless polished, demonstration of aerobatics in a London Aeroplane Club Tiger. Soon after her excellent show was over the Chilton was sighted, well on its course. Not far behind it came H. D. Rankin (Hawker Tom Tit) and L. Arnott (Wicko II). Some little time after, H. J. Wilson, in C. S. Napier's Percival Gull, appeared well to the north of his true course, as did R. A. Winter in the rather lethal-looking, roofed-in Gipsy-Comper. Then the T.K.2 turned up, seemingly well up on time, in spite of every sign of an over-rich mixture, indicated by a trail of black smoke.

While the spectators waited for news of the competitors' progress from Swansea, Councillor George Williams thanked the Cardiff Club for organising the race, as well as the Automobile Association and the police for their assistance. Then Mr. W. T. Beavan, J.P., persuaded to speak before the microphone, expressed a wish "to see the sky full of young aviators" (he did not say whether his viewpoint would be from the ground or the sky). Finally, Mr. Kenneth Davies announced that the Chilton was reported leading the race at the Swansea turning point. Hopes for the Cardiff Club's entry, the Wicko, fell when it was announced that the Percival Gull had overtaken it. Fourth lay the Comper, and not far behind was the T.K.2. Last was Mr. H. D. Rankin's Tom Tit. The crowd settled down to some expectant waiting, and laughed immoderately when the loud speakers announced that a small boy answering to the name of Tony had lost his mother and "did not know the name of his father."

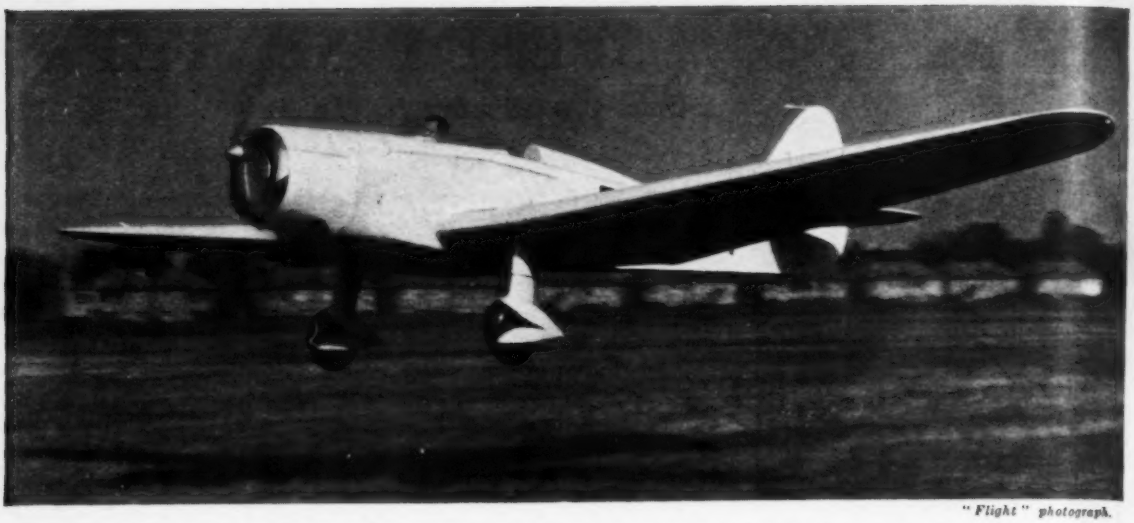
Machine.	Pilot.	Handicap.	Time.	Speed.	Order on Speed.
		min.sec.	hr. min. sec.	m.p.h.	
1. T.K.2	G. de Havilland	Scratch	1 00 28	187.5	1
2. Percival Gull ...	H. J. Wilson ...	16 04	1 16 59	145.1	3
3. Gipsy-Comper...	R. A. Winter ...	09 24	1 11 23	158.8	2
4. Wicko II ...	L. J. Arnott ...	20 28	1 23 48	135.3	4
5. Chilton ...	R. L. Porteous	41 44	1 47 22	105.6	6
6. Hawker Tom Tit	H. D. Rankin...	28 48	1 36 37	117.4	5

In the last 35 miles from Swansea to Cardiff the entry closed up and, to all intents and purposes, its order was reversed. De Havilland streaked through the bunch to win by the narrow margin of 27 sec. from Wilson in the Gull. But that was not all, for the third and fourth home, Winter (Gipsy-Comper) and Arnott (Wicko II) crossed the line 1 min. 31 sec. and 2 min. 52 sec. respectively after the first man—a finish on which Messrs. Dancy and Rowarth are to be congratulated.

The race was over, but for members and friends it signalled the start of an equally important part of the programme—the preliminaries of the Club's annual dinner. In spite of sartorial arguments—to change or not to change—the party was a jolly one. It was held in a marquee alongside the hangar. Notabilities such as Joe Scholes, Dudley ("Bats") Page, and others were welcomed by Mr. Kenneth Davies. Prize winners were called upon to make speeches, the shortest coming from H. J. Wilson, who simply said "Thanks." Afterwards, Capt. W. R. Bailey called upon Messrs. W. N. C. Cope and Redvers Smith to accept a monstrous C. D. C.—at least 4ft. in diameter—upon which they promptly tried to play roulette.

"Flight" photograph.

Flt. Lt. H. J. Wilson was second at 145.1 m.p.h. in a Percival Gull



"*Flight*" *photograph.*

MOSSCRAFT'S LATEST PRODUCT being demonstration-flown at Hanworth by Mr. W. H. Moss, one of the five Moss brothers — who, incidentally, are all pilots. It is an open tandem-two-seater sports model powered by a Pobjoy Niagara III. Mechanically operated split flaps are fitted. Dual control is a feature which makes the Mosscraft suitable for C.A.G. purposes. Top speed is 134 m.p.h., cruising 115 m.p.h. and landing 38 m.p.h.

NEWS of the WEEK

Links Across the Ocean

LAST Monday an informal luncheon was given by Air Comdre. P. F. M. Fellowes, D.S.O., to enable his guests to meet Mr. Edwin Link, of Link Trainer fame. During lunch Mr. Link told us, in a becomingly modest manner, that the present trainer is based on a machine he evolved when an instructor in 1928 to teach his pupils control reactions without their leaving the ground, thereby saving time and money. He is of the firm conviction that a pupil does not begin to learn to fly until he is flying solo, which is quite a reasonable line of thought.

Another remark made by Mr. Link was that in America a pilot is not considered a good instrument flyer until he has done at least 30 hours "blind." Quite an amusing thought is the fact that his company has supplied two Link Trainers fitted with automatic pilots. Students now under instruction on the Link may envy these "George"-assisted trainees, but as Mr. Link stressed, he has seen that, while aircraft are designed to be as stable as possible, "Old Man Stability" has been purposely evicted from his trainer so that the difficulty of flying in unstable conditions may be properly mastered.

The inventor mentioned that there have been several instances of *ab initio* pilots who, at the first attempt, have flown as to the manner born after having received correct instruction on the Link Trainer.

The Latest Fairchild

VERY shortly one of the new Ranger-engined four-seater Fairchild 24 monoplanes will be coming over here for demonstration purposes. It will be flown in this country and in Europe by Mr. Donald Wilson, the sales engineer of the Fairchild Corporation.

It is stated that any pilots or owners who are interested in the machine can make arrangements to fly in it through Malcolm and Farquharson, of 302, Bath Road, Hounslow, Middlesex, who are the British agents for the type.

Air League Lectures

THE subjects upon which Air League speakers will talk during the forthcoming lecture season are: "Wings of Commerce," "Linking the Empire by Air," "The History of Aviation," "Learning to Fly," "The Story of the Royal Air Force," "Defence Against the Air Raider," "World Aviation," "Aviation as a Career."

As usual (states the League), there will be no charge for the services of speakers, but refunds or contributions towards the defraying of their expenses are welcomed when these can be made without embarrassment to the organisations concerned.

Application should be made to the Secretary-General, Air League of the British Empire, Maxwell House, Arundel Street, London, W.C.2.

The Edmonton Accident

THE proceedings at the inquest on September 7 on eleven victims of the Edmonton accident (another has died since) raised a number of points that may be of interest to those operating flying schools, and we therefore place them on record at some length for future reference. Some of the questions asked are of particular importance as examples of what may be expected at enquiries of this kind.

On Sunday, September 4, a Hawker Audax, flown by Sgt. S. R. Morris, attached to No. 1 Elementary and Reserve Training School, Hatfield, descended into a housing estate in Edmonton, North London, striking two houses, causing a fire and bringing about the death, either instantly or through injuries, of eleven persons in addition to the pilot himself. Several of the victims were persons who made heroic attempts at rescue.

The jury returned a verdict of accidental death in each case.

According to *The Times* report of the inquest, Dr. A. Piney said that there was nothing he could see to have caused illness while Morris was in the air.

Capt. R. G. Weighill, flying instructor of No. 1 Elementary and Reserve Flying Training School, Hatfield, said that a pupil was not allowed to go into the air alone until his instructor thought he was fit for flying and until he had been tested by another instructor. Morris had completed 101 hours 40 minutes of solo flying time, and 43 hours 10 minutes of flying time under dual control. He was a fully qualified pilot.

The CORONER (Dr. Cohen).—Who would give him any instructions that day?—I did. My instructions were that he was to do circuits and landings and climbing turns. They would be done within the three-mile radius specified in the school's standing orders. Edmonton is about 12 miles from the aerodrome.

The CORONER.—How do you account for his being there?—I don't know.

He was not acting according to your instructions?—No.

I will put it more plainly; he was acting against your instructions?—Yes.

Capt. Weighill said that on Sunday morning Morris had been out in a different aeroplane with instructions to do steep turns instead of climbing turns. Since the accident he had heard that Morris had been seen over Highgate between 12 and 12.40.

The CORONER.—If we get evidence that the machine was serviceable when it left that day then it must fall down through the pilot?—Yes.

Capt. Weighill said that Air Ministry regulations made it compulsory to fly at certain heights over towns and populated areas. The height varied. It might be 10,000ft. over large cities and 2,000ft. over smaller towns. Air conditions were good at the time of the accident and it would be possible to see that there was a town underneath.

Questioned by Mr. Neil Lawson, who represented the relatives of three of the victims, Capt. Weighill said he was present on the field when Morris took off.

Mr. Lawson.—If a pupil has taken off to act in accordance with his instructions, what steps do you take to see that these instructions are carried out?—It is very difficult to watch him all the time.

Did you watch him at all?—On these occasions, no.

Was that because you had too much else to do?—No. I had confidence in him.

It was no one's duty to watch him if you did not?—No.

Mr. T. Greenslade, of Hatfield Aerodrome, said that the Rolls-Royce engine of the aeroplane was in perfect condition and fit to be flown. It had been flown two and three-quarter hours by other pilots the same morning, and there were no complaints. On Sunday morning he tested the machine to see if the petrol, oil, and water were satisfactory.

The CORONER.—Am I right in saying you do not inspect the engine after every flight?—Not if there is no adverse report on the machine. It is tested by an instructor, who passes it O.K.

Capt. F. S. Wilkinson, Air Ministry Inspector of Accidents, said all the routine inspections of the machine had been carried out.

Mr. E. Stancombe, a rigger at the aerodrome, said the controls of the machine were all right. They were examined on Saturday evening and looked at again on Sunday. There was nothing wrong at all with the machine and he signed the certificate of safety.

Mrs. Florence Sheen, of Dunholme Lane, said that when she was indoors at about 2.40 on Sunday afternoon she heard a loud noise of an aeroplane which was flying very low. It caught the corner of her house, and the wheel came off and fell into the road. It then went on and struck another house. She saw the man in the machine waving his hand over the side as if to the children.

Mr. W. B. Spall, of Chalfont Road, Edmonton, said he heard an aeroplane whistling, and saw it coming from the north about 3ft. above the houses. It just missed his house. There was no smoke or flame. The pilot was leaning over the side of the machine, and seemed to be shouting.

The CORONER said he was satisfied that they would gain nothing from adjourning the inquest to see if they could get a report from the Air Ministry. It was not the custom to give the information, and they had had a lot of evidence to show that the machine was in perfect working order.

The pilot had been seen the same morning in another district of London, a good many miles from the aerodrome, although he had had instructions to carry out certain exercises on the aerodrome. When he signed the book afterwards he signed that he had done what he was supposed to do, but he did not say that he had done more.

Dealing with the question whether there was sufficient supervision, the Coroner said they had been told that the pilot was experienced and would be expected to be obedient and carry out his duties. If he were disobedient he would be reported to the authorities, who would have something to say to him. It was clear that Morris was with the machine over a populous area, and he was there obviously not only against instructions, but against Air Ministry regulations. It was quite sufficient for the jury to say that there was no culpable blame, that is, blame amounting to manslaughter on the part of the pilot. It was quite sufficient to record an "Accidental death" verdict, and to add nothing more.

No-claim Bonus!

LLOYD'S UNDERWRITERS are making a presentation of a gold cigarette case, together with a cheque, in recognition of F/O. Clouston's recent record flights, and in appreciation of the good work he did in landing the Comet with a broken undercarriage at Cyprus and flying the machine back in a jury-rigged condition.

The gold cigarette case is, in the words of a well-known jeweller, "a masterpiece of the gold worker's art," and is inscribed: "From Lloyd's Underwriters to F/O. Clouston, to mark their admiration and gratitude for his flights in the Comet G-ACSS, 1937-8: Damascus Race; Croydon-Cape-Croydon; U.K.-N.Z.-U.K."

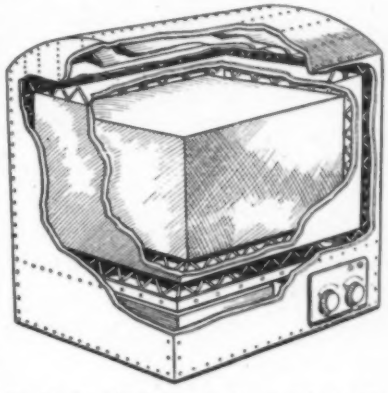
With typical bashfulness Clouston was reluctant to come up to the City to receive the case and the F/O. C. F. Hughesden, representing the brokers—Stewart, Smith and Co., Ltd.,—who have handled all the insurances on the Comet since it was rebuilt, is making the presentation to Clouston at Farnborough.

Another Automatic S.O.S.

ON the face of it, there seems little justification for equipping an aeroplane with an automatically operated distress radio transmitter in districts other than the more remote territories encountered in Australia, Africa, and the Americas, not forgetting the two Poles. But it is a fact that machines have been lost for days in the British Isles. From this it would seem that a crash-proof unit would be useful.

In *Flight* of September 1, 1938, brief details were given of a distress radio transmitter designed by an Englishman in America. But as long ago as April this year, Mr. R. V. Wrightson took out a provisional patent in London to cover a simple type of distress-call transmitter designed to work under the most adverse conditions.

Briefly, it is a two-valve transmitter with an electrically driven drum which, in contact with suitably placed studs, causes a distress signal and the call sign of the aircraft to be transmitted. This instrument is slung by rubber cords in an asbestos-lined case, which in turn is similarly mounted inside an outer case that is also lined with asbestos. The outer case houses one accumulator and two 120-volt dry cell batteries. The top of the outer case is an air-tight cell, shaped to conform to that portion of the fuselage in front of the tail fin, which is where the instrument would be placed in medium-sized aircraft, for the tail is usually the least damaged portion in a crash. The outer case is designed to be carried between the longerons and attached with special soluble mountings, so that in the event of the machine becoming waterlogged, the instrument would float free and still operate.



This part-section shows the interior of the Wrightson apparatus.

At the moment the set is designed with an aerial lying loose, in a V-channel, along the bottom of the fuselage, but experiments are to be made with a coiled-strip spring steel aerial. It is Mr. Wrightson's intention that the set should begin to operate in the event of the undercarriage breaking or if the engine stops with the ignition switch on. In both cases a breakage in a circuit would set it in operation. The set will be designed to transmit on 70 metres, with a smaller model available for 5 metres.

Mr. Wrightson is a member of the recently formed firm of Morrisons, Ltd., of Purley Way, Croydon. Morrisons, Ltd., was formed to take over the manufacturing side of Wrightways. Under the guidance of Mr. McGiveney and Mr. Wrightson—both of whom played a big part in the formation of Wrightways—this new firm, with its large, modern factory, is concentrating on many types of work involved with Admiralty and Air Ministry contracts, including the manufacture of wing tips, oleo fairings, leading edges and various types of panel and riveting work.

F/O. G. H. Welsh

F/O. G. H. WELSH, D.F.C., until recently chief flying instructor at the Beford School of Flying, Barton, states that he no longer has any connection with this school.

Forthcoming Events

September 11-18. Swedish Civil Aviation Week.

September 20. R.Ae.S. Graduates and Students Section: Annual General Meeting, 7, Albemarle Street, London, W 1.

September 21. Aero Golfing Society: Cellon Trophy, Richmond Golf Club.

September 27. R.Ae.S. Graduates and Students Section: Inaugural Address, 7, Albemarle Street, London, W.1.

October 14. Northamptonshire Aero Club: Annual Ball, Salon de Danse, Northampton.

October 15. South Coast Flying Club: Annual Dinner and Dance, Grand Hotel, Brighton.

October 20. R.Ae.S. Lecture*: "Light Alloys in Aircraft Construction," by M. le Coeuvre.

November 3. R.Ae.S. Lecture*: "The Meteorological Problem of the North Atlantic," by Capt. F. Entwistle, B.Sc.

November 9 (Wednesday). R.Ae.S. Lecture*: "American Aircraft," by T. P. Wright, F.I.Ae.S., F.R.Ae.S.

November 17. R.Ae.S. Lecture*: "The Work of the D.V.L.," by Dr. F. Seewald.

November 18 - December 4. Paris Aero Show, with Air Transport Congress.

December 1. R.Ae.S. Lecture*: "Flying Controls," by Prof. G. T. R. Hill, M.C., M.Sc., F.R.Ae.S.

December 15. R.Ae.S. Lecture*: "Some Results from the Deutsche Forschungsanstalt für Segelflug Smoke Tunnel," by Herr A. Lippisch, A.F.R.Ae.S.

* All these Lectures take place at 6.30 p.m., at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1

THE INDUSTRY

John Brown, Shipbuilders, Acquire Westland

TWO shipbuilding firms, Harland and Wolff, of Belfast, and Swan Hunter, of Tyneside (apart from the Blackburn Denny works on Clydebank) already have an interest in aircraft construction under the rearmament programme, and now there has been added a third—the great Clydeside firm of John Brown and Co., Ltd., builders of the *Queen Mary* and (on the stocks at present) the *Queen Elizabeth*.

John Brown, it was announced last Friday, have acquired from Petters, Ltd., a controlling interest in Westland Aircraft, Ltd., who, of course, are busy with large orders for the Lysander army co-operation monoplane.

Not only will the industrial experience of John Brown (and its associated steel specialists Thomas Firth and John Brown) thus be brought to bear on the problems of large-scale aircraft production, but the capacity of the Westland works at Yeovil, Somerset, will be doubled. This has been made possible by the acquisition, with Air Ministry approval, of the works and lands at present occupied by Petters, Ltd. The sum involved is £187,500, represented by 600,000 Ordinary shares of 5s. each.

Petters, in their turn, have disposed of the assets of their old-established oil-engine business (other than lands and buildings) to the Brush Electrical Engineering Co., Ltd., and as from January 1 the manufacture of Petter engineering products will be transferred to Loughborough, Leicestershire.

Lord Aberconway becomes chairman of the Westland Company in place of Mr. Alan P. Good, who, however, remains a director. Sir Holberry Mensforth and Mr. S. W. Rawson have also joined the Board. Mr. Charles Hill, one of the Petter representatives on the Board, has resigned.

Mr. T. B. Keep will continue as managing director of Brush Electrical.

The official announcement of the changes sums up with the statement: "As a result of these transactions, Petters, Ltd., will be a holding company deriving its income from its agreement with and interest in the Brush Electrical Engineering Co., Ltd., and from its other substantial investments."

Air Minister at Alvis Works

THIS week Sir Kingsley Wood has been paying more visits to aircraft works. Last Tuesday, on his way to inspect several Midland shadow factories, he was due to make his first point of call at Coventry the Alvis works.

Among the engines which he would see would be one recently developed and civil-type-tested by Alvis, the Leonides. This is a small nine-cylinder radial of 450 h.p. An example should soon be flying at Portsmouth, having been fitted to a Bristol Bulldog loaned by the Air Ministry.

Captain Stack for Longbridge

AS announced in *Flight* last week, Squadron Leader T. H. England is relinquishing his post of chief test pilot for the Austin Aircraft Works at Longbridge, near Birmingham.

The post is being filled by Captain T. Neville Stack, who returned two or three weeks ago from Turkey, where he delivered British aircraft and instructed Turkish pilots to fly them. Unofficially he was advising the Turkish Air Ministry on the establishment of civil airlines.

It may be recalled that Captain Stack made the first trip by light aeroplane to India in 1926, accompanied by Mr. B. S. Leete. Later he became chief instructor to National Flying Services, and in 1935 was appointed Air Superintendent to Hillmans Airways.

Two Useful Alloys

THE characteristics of Monel and Inconel which make these nickel-copper and nickel-chrome alloys particularly suitable for fabrication into certain aircraft components are explained in some detail in a nicely bound little book, *Monel Data Book I*, recently published by Henry Wiggin and Co., Ltd.

For example, Monel is claimed to be highly satisfactory for tanks, floats, radiators and other parts specially liable to corrosion. It is pointed out that the slightly greater density of Monel as compared with the orthodox materials is counterbalanced by the fact that lighter sections may be used in view of the absence of corrosion risk.

On the subject of radiators, it is stated that the possibility of producing thin strips in relatively wide widths suitable for stamping, and the rigidity of the elements so obtained, coupled with the facility with which electric welding or soft soldering can be carried out, permits the production of extremely light radiators, capable of resisting high pressures. The smooth surface of Monel favours thermal exchange, and this surface is not attacked by water, oil or ethyl glycol.

Inconel, already extensively used for aircraft exhaust manifolds, has a high resistance both to oxidation by heat and to the corrosive elements present in combustion products of high-octane fuels.

Applications of these alloys to factory plant (e.g., pickling vats) are also explained in the booklet, which is obtainable on application to Henry Wiggin and Co., Ltd., at Thames House, Millbank, London, S.W.1.

Forgings and Stampings

A PUBLICATION just issued by Head, Wrightson and Co., Ltd., Thornaby-on-Tees, deals with their drop forgings and stampings for the automobile and other industries.

Ventilating Fans

THE latest types of "Genalex" works exhaust fans, embodying a number of improvements, are described in a leaflet issued by the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. Flameproof models, particularly suitable for dope-shop ventilation, are featured.

INCREASES OF CAPITAL

EASTBOURNE FLYING CLUB LTD., (The Aerodrome, Wilmington, Sussex)—The nominal capital has been increased by the addition of £2,750 in £1 ordinary shares beyond the registered capital of £1,250.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: Report No. 1807 Measurements of Acceleration and Water Pressure on a Seaplane when Dropped into Water, by E. T. Jones, G. Douglas, C. E. Stafford and B. K. Cushing, 5s. No. 1811: Note on Wind Tunnel Tests on the Design of Cabins, by J. H. Hartley, D. Cameron and W. H. Curtis, 3s. No. 1813: Drag Tests on a Fabric Covered, and a Polished Plywood, Wing in the 24 ft. Tunnel, by K. V. Diprose, 2s. 6d. No. 1815: The Divergence Speed of an Elastic Wing, by A. G. Pugsley and G. A. Naylor, 3s. No. 1817: Experiments on an Elliptic Cylinder in the Compressed Air Tunnel, by D. H. Williams and A. F. Brown, 1s. 6d. No. 1820: Notes on a Method of Analysis of Ground Run during Take-off, by S. B. Gates, 2s. H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2.

Aeronautical Research Committee Reports and Memoranda. Report No. 1799: Approximations to Functions and to the Solutions of Differential Equations, by R. A. Frazer, W. P. Jones, and Sylvia W. Skan, 4s. 6d. No. 1822: Relaxation Methods applied to a Spar of Varying Section deflected by Transverse Loading combined with End Thrust or Tension, by R. J. Atkinson, K. N. E. Bradfield, R. V. Southwell, 4s. 6d. No. 1826: Flight Tests on the Profile Drag of 14 per cent. and 25 per cent. Thick Wings, by J. E. Serby, M. B. Morgan and E. R. Cooper, 3s. 6d. H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2.

"Staybrite" Steel in Architecture; Firth-Vickers Stainless Steels, Ltd., Staybrite Works, Sheffield 9.

Aluminium Tubes and Pipes; The British Aluminium Co., Ltd., Adelaide House, King William Street, London, E.C.4.

Bollettino Dell'Aviazione Civile e Del Traffico Aereo; Istituto Poligrafico Dello Stato Libreria, Roma, Italy.

Firth-Vickers Rust-, Acid- and Heat-resisting Steels.

The Manipulation of Corrosion- and Heat-resisting Steels.

The Machining of Corrosion- and Heat-resisting Steels; Firth-Vickers Stainless Steels, Ltd., Sheffield.

What about the Airship? The Challenge to the United States, by Cdr. C. E. Rosendahl; 10s. 6d., Charles Scribner's Sons, Ltd., 23, Bedford Square, London, W.C.1.

Slownik Technicmy, by W. Czterech Jezyach. Niemiecki, Warsaw, Poland.

Foreign Air Regulations Handbook, No. 13: Greece. 9d. By post from Air Ministry, Adastral House, Kingsway, London, W.C.2, or by personal application from The Civil Aviation Information Bureau, Ariel House, Strand, London, W.C.2.

Prospectus of the Northampton Engineering College, 1938–1939.

Evening Courses in Engineering, 1938–1939. Northampton Polytechnic, St. John Street, London, E.C.1.

The Royal Air Force, by F. V. Monk and H. T. Winter; 3s. 6d., Blackie and Son, Ltd., 50, Old Bailey, London, E.C.4.

Sea Flags: Their General Use, by Com. H. P. Mead: 3s. 6d., Brown, Son and Ferguson, Ltd., 52–58, Darnley Street, Glasgow, S.1.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(*Published September* 15, 1938)

4666. UNITED AIRCRAFT CORPORATION: Oppositely-rotating co-axial propellers (490,535).

4695. MITCHELL, F.W.: Helicopter (490,741).

4907. SPERRY GYROSCOPE CO., INC.: Bomb-sights for aircraft (490,811).

5468. CONTRAVES AKT.-GES: Method and apparatus for determining errors in aim in firing practice against moving targets, more especially aircraft (490,694).

5516. WEIR, LTD., G. & J. and PULLIN, C. G.: Rotary wings or blades for rotating-wing aircraft (490,697).

10297. AUTOMOTIVE PRODUCTS CO., LTD. and BROCK, D. T.: Liquid-pressure systems for power transmissions (490,779).

14765. BRISTOL AEROPLANE CO., LTD., FEDDEN, A. H. R., and NINNES, R. L.: Change-speed gearing (490,705).

22584. AEROSTATICA AVORIO SOC. IN ACCOMANDITA SEMPLICE: Detachable pack parachute apparatus (490,798).

25488. SIEMENS APPARATE UND MASCHINEN GES.: Automatic steering for vehicles, in particular aircraft (490,572).

31088. SPERRY GYROSCOPE CO., INC.: Gyro-verticals (490,724).

2804. LORENZ AKT.-GES., C.: Radio direction-finding systems (490,650).